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February 1, 2019

Attention: Jesse Aviles

United States Environmental Protection Agency
1595 Wynkoop Street
Denver, CO 80202-1129

Subject: Technical Memorandum on Scoping the Revised Remedial Investigation for Vasquez Boulevard I-70, Operable Unit 2

Dear Jesse,

This letter report has been prepared by Stantec Consulting Services Inc. (Stantec) on behalf of the City and County of Denver, Colorado (CCoD) to summarize the scope of additional work recommended at the Operable Unit 2 (OU2) portion of the Vasquez Boulevard and Interstate 70 (VB/I-70) Superfund site for completion of the Remedial Investigation (RI). It is intended to fulfill the requirement of the "Draft Technical Memorandum on Scoping the RI" deliverable as requested by the United States Environmental Protection Agency (EPA) in Table 1 of the notification letter *Additional Work Notification for Vasquez Boulevard I-70, Operable Unit 2 Remedial Investigation/Feasibility Study*, dated August 28, 2017.

An RI for OU2 was conducted in 2008 (referred to as the 2009 RI) in accordance with the *Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study* (AOC), CERCLA-08-2008-0011, for OU2 between EPA and the CCoD, the "Respondent" (Engineering Management Support, Inc. [EMSI], 2009). Additionally, a Baseline Human Health Risk Assessment (HHRA) and a Screening Level Ecological Risk Assessment (SLERA) were conducted in 2009 (EPA, 2009a, 2009b). Several sampling events have occurred within and proximal to OU2 since the submittal of the 2009 RI, HHRA and SLERA. As a result, the EPA issued the aforementioned *Additional Work Notification* letter to CCoD to modify the Statement of Work (SOW) from the AOC to allow for revisions and updates to the RI and Feasibility Study (FS), and to include an update to the conceptual site model and risk assessments. This letter report provides recommendations for updating the RI, HHRA, and SLERA based on the additional sampling results and current industry standards. A draft FS will be submitted in conjunction with the draft RI.

On behalf of the CCoD, Stantec conducted a review of the data collected since the 2009 RI in addition to data collected before and as part of the 2009 RI. A summary of these data, as well as an updated conceptual site model and risk assessment approach, are provided in the *Summary of Historical Site Characterization and Updated Conceptual Site Model* report, provided as **Attachment 2** to this letter. Based on this review, data gaps were identified and general recommendations for additional work were made to update the site characterization and meet the data objectives for the revised RI, as described in Section 7 of **Attachment 2**.

The general scope of the activities to update the RI, HHRA and SLERA is described herein. Following stakeholder concurrence on the scope of the updates, details on sampling procedures and methodology will be provided in a Remedial Investigation Work Plan, as described below. It should be noted that the scope of work described herein may be modified slightly based on the data quality objectives that will be developed as part of the RI Work Plan; however, any potential changes are not anticipated to be significant.

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SITE AND PROJECT BACKGROUND

The VB/I-70 Superfund site is located in the north-central portion of Denver, Colorado near the intersections of Interstate 70 and Brighton Boulevard and consists of three Operable Units (OUs). OU2 consists of the area of the VB/I-70 Superfund Site formerly occupied by the Omaha & Grant Smelter facility, which operated from 1882 to 1903. For a time, portions of OU2 were also operated as a municipal landfill; however, specific information on periods of operation or the nature of landfill activities are unknown. Between 1894 and 2012, portions of OU2 were deeded to CCoD, Union Pacific Railroad, the Pepsi Bottling Company, and various other corporate entities or individuals. The CCoD constructed the Denver Coliseum circa 1950 which encompasses part of the northeast portion of the former Omaha and Grant Smelter facility. The Globeville Landing Park within the southwest portion of OU2 along the South Platte River was constructed in the 1970s (EMSI, 2009). A depiction of OU2 site features and current site ownership are shown on **Figure 1**. Additional details on the site, such as topography and hydrogeology, are provided in Section 2 of **Attachment 2**.

Site investigations within and near OU2 were conducted from the early 1990's to recent investigations in 2017 and 2018, resulting in a fairly robust set of environmental data. However, the investigations varied in their scope, purpose, thoroughness, and documentation. Additionally, the investigations conducted after the 2009 RI had not been collectively reviewed and evaluated. As a result, a review of the available data was conducted to identify the usability, quality, and completeness of the data. Recent work conducted at the site (i.e., Globeville Landing Outfall Project), and its impact on site characterization, was also summarized and reviewed. The results of these reviews and the basis for the additional work recommended herein are provided in **Attachment 2**.

The next key steps in the CERCLA process for OU2 in accordance with the updated SOW (EPA, 2017) are as follows:

1. Develop an RI/FS Work Plan, which will include the methods and screening values for the HHRA and SLERA
2. Complete site characterization
3. Complete a revised RI, HHRA, and SLERA
4. Complete a revised FS

To complete the RI, collection of select additional data is recommended below.

SUPPLEMENTAL REMEDIAL INVESTIGATION RECOMMENDATIONS

Most of the environmental data from both recent and historical investigations are considered usable for the revised RI, HHRA, and SLERA. However, there are some data gaps to be addressed for the revised RI, HHRA, and SLERA to adequately support a Record of Decision (ROD) and to inform decisions for redevelopment of OU2. The scope of work to fulfill the additional data needs is summarized below.

Groundwater Well Installation

Installation of nine additional groundwater monitoring wells are recommended to advance the characterization of the shallow alluvial aquifer at OU2, including:

- Three wells along the north side of Brighton Boulevard, just outside the OU2 boundary
- Four wells within the Coliseum parking lot
- One well in the Globeville Landing Park

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- One well along 38th Street to the south of the OU2 boundary

The approximate locations of each of the proposed wells along with existing wells are shown on **Figure 2**. These locations may shift slightly following field verification. The wells will be installed at adequate depths and screened intervals (e.g., across the water table) consistent with the groundwater levels within the shallow alluvial aquifer at the site and to account for slight seasonal fluctuations. The specific depths and screened intervals for each location will be described in the RI Work Plan. During well installation, the geology will be logged to characterize the subsurface conditions (e.g., geology, oxide staining, odors, potential presence of slag or landfill materials, etc.) in accordance with industry standards.

Groundwater Sampling

All nine new wells along with five existing wells (MW-02, CTL MW-04, CTL MW-05, PZ-1, PZ-3) for a total of 14 wells are recommended for sampling for the eight Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), volatile organic compounds (VOCs), and total petroleum hydrocarbons (TPH). The locations of the wells that are recommended for sampling are highlighted on **Figure 3**. The anticipated sampling and analysis methods for the wells are provided below in Exhibit 1.

Exhibit 1: Groundwater Sampling Summary		
Sampling Location	Target Analyte(s)	Analysis Method
MW-02, CTL MW-04, CTL MW-05, PZ-3, and all nine new wells	arsenic, barium, cadmium, chromium, lead, selenium, silver	EPA 6020
	mercury	EPA 7470A
	VOCs	EPA 8260B
	TPH	EPA 8015B

Groundwater sampling using standard low-flow sampling methodology is recommended for these 13 wells on a quarterly basis for the period of one year. Groundwater level gauging measurements are also recommended during the quarterly groundwater sampling events and will include all existing site wells.

Soil and Soil Vapor Sampling

Collection of soil samples from the nine borings advanced for the new well locations is recommended. In addition, soil sampling is recommended at two of the borings that will be advanced for the soil vapor sampling (discussed below). Generally, depth discrete samples will be collected from shallow (0 to 2 feet below ground surface [bgs]), subsurface (approximately 5 feet bgs), and deep (just above the water table) for a total of three samples from each boring. For borings outside the OU2 boundary, the numbers of samples may be adjusted. Soils will be analyzed for the eight RCRA metals, VOCs, and TPH. The recommended soil sample locations are shown on **Figure 3**. The anticipated sampling and analysis methods for soil are provided below in Exhibit 2.

Exhibit 2: Soil Sampling Summary		
Sampling Location	Target Analyte(s)	Analysis Method
Nine new well locations and two soil vapor locations	arsenic, barium, cadmium, chromium, lead, selenium, silver	EPA 6020

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Exhibit 2: Soil Sampling Summary		
Sampling Location	Target Analyte(s)	Analysis Method
	mercury	EPA 7470A
Nine new well locations and two soil vapor locations	VOCs	EPA 8260B
	TPH	EPA 8015B

Collection of soil vapor samples is recommended at seven locations as follows:

- Five sample locations within the Coliseum parking lot
- One sample near the center of the Coliseum Barn
- One sample north of the Coliseum parking lot beneath I-70

The recommended soil vapor sample locations are shown on **Figure 3**. Samples are recommended for analysis of methane and VOCs to evaluate the potential sources of vapor intrusion at the site (e.g., landfill materials or impacted groundwater).

Sediment and Surface Water Sampling

Sediment and surface water sampling are recommended at three locations along the South Platte River to the west of OU2 as shown on **Figure 3**. Sediment and surface water samples are recommended for analysis of the eight RCRA metals and VOCs. A single sediment sampling event is recommended. Collection of surface water samples is recommended quarterly for the period of one year and should be coordinated with the quarterly groundwater sampling.

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT RECOMMENDATIONS

Risk assessment is an evolving science and important changes in assumptions, models, and exposure pathways of potential concern have occurred since the previous HHRA and SLERA were completed for OU2. Consistent with EPA's request, the Conceptual Site Models (CSMs) for land use, receptors, and pathways of exposure will be updated to reflect current and anticipated development patterns in this area of Denver. Relevant sampling results from historical investigations will be integrated with the new data proposed in this report to identify chemicals and environmental media of potential concern not previously considered (i.e. VOCs in the subsurface and the vapor intrusion pathway). The HHRA and SLERA will rely on current EPA guidance documents, published screening level media concentrations for humans and ecological receptors, current toxicity factors and exposure variable values, and the most current versions of EPA's blood lead models.

REPORTING

Field Work Reporting

The methods and procedures for conducting the additional work recommended above will be detailed in a RI/FS Work Plan, including those specified for the HHRA and SLERA. The RI Work Plan will describe the data quality objectives and include a sampling and analysis plan (SAP), a quality assurance project plan (QAPP), and a health and safety plan (HASP). The RI Work Plan will be submitted in accordance with the proposed schedule outlined below.

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Once field work has begun, data reports will be submitted for each quarterly event to provide a brief summary of the work conducted and the tabulated results. Data evaluation and interpretation will not be included in the quarterly data reports, but rather presented collectively with the rest of the site data in the RI Report.

Remedial Investigation and Feasibility Study Reporting

Following completion of the recommended field work, the RI will be revised by compiling a new RI Report that incorporates data from relevant investigations since the previous 2009 RI and the data from the additional work recommended herein. As mentioned previously, a revised FS will also be completed for submission in conjunction with the RI. The RI portion of the RI/FS Report will also include the results of the HHRA and SLERA, which will be revised as appropriate based on the additional sampling results.

PROPOSED SCHEDULE

The proposed schedule for key deliverables and field activities to fulfill the needs of the RI and FS is provided in Exhibit 3 below.

Exhibit 3: Proposed Schedule	
Task or Deliverable	Timeline
Meeting with CCoD and EPA to Discuss Additional Work Recommendations	One week after the submittal of this Technical Memorandum (early February)
EPA Response on Additional Work Recommendations for OU2 to CCoD	One month after receipt of this Technical Memorandum (early March)
Submittal of <i>Draft RI/FS Work Plan</i> to EPA	One month after receipt of EPA's comments on the Technical Memorandum Scoping the Revised RI (late-March)
EPA Comments to CCoD on <i>Draft RI/FS Work Plan</i>	Two weeks after Submittal of the Draft RI/FS Work Plan (mid-April)
Submittal of <i>Final RI/FS Work Plan</i> to EPA	Two weeks after receipt of EPA comments on the Draft RI/FS Work Plan (late April to early May)
Approval of <i>Final RI/FS Work Plan</i>	One week after submission (early to mid-May)
Field Activities	Q2 2019 to Q1 2020: Well installations, groundwater and surface water sampling, soil, soil vapor, and sediment sampling
Submittal of <i>Draft Remedial Investigation and Feasibility Study Report for OU2</i>	Q2 2020
EPA Comments to CCoD on Draft RI/FS Report for OU2	One month after submittal of the RI/FS report (early Q3 2020)
Submittal of <i>Final Remedial Investigation and Feasibility Study Report for OU2</i>	End of 2020

Q1 – first quarter, Q2 – second quarter, Q3 – third quarter, Q4 – fourth quarter

February 1, 2019

Jesse Aviles

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Please do not hesitate to contact us if you have questions regarding the recommendations contained herein.

Regards,

Stantec Consulting Services Inc.



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Environmental Quality, City and County of Denver

Attachments:

Attachment 1: Figures

- Figure 1: Site map
- Figure 2: Proposed Well Installations
- Figure 3: Proposed Sampling Locations

Attachment 2: Summary of Historical Site Characterization and Updated Conceptual Site Model

References:

EMSI, 2009. Remedial Investigation Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2 – On-Facility Soils, Former Omaha and Grant Smelter. December 16

EPA, 2017. Letter from Dania Zinner of the EPA to Ms. Jennifer Luthi of the CCoD: Additional Work Notification for Vasquez Boulevard I-70, Operable Unit 2 Remedial Investigation/Feasibility Study. August 28


EPA, 2009a. Final Screening-level Ecological Risk Assessment (SLERA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, Colorado. August.

EPA, 2009b. Final Baseline Human Health Risk Assessment (HHRA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, Colorado. August.


ATTACHMENT 1


Figures





 Operable Unit 2 (OU2)


Land Ownership


 Parcel Boundary


 Bottling Group LLC Brighton


 Annex LLC

 City & County of Denver


 Forney Museum

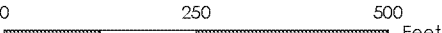
 HDP One Brighton LLC

 Union Pacific RR Co

 Westfield-Amen LLLP

"123" - Parcel Number




1:3,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Services - DigitalGlobe (6/19/2017)

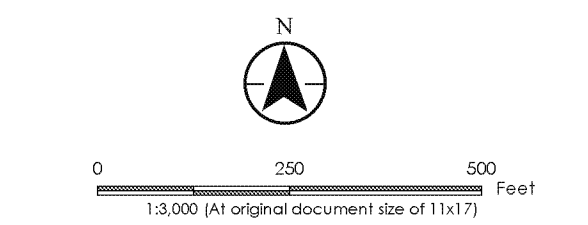
Project Location T3N, R68W, S23 Denver County, CO	Review Prepared by CBB on 2018-05-31 Technical Review by TL on 2018-06-01
----------------------------------------------------------------	----------------------------------------------------------------------------------------

Client/Project City and County of Denver VB/I-70 Remedial Investigation
Figure No. 1
Title OU2 Site Map

Figure 1



- Proposed Wells
- Existing Wells and Piezometers**
- ASARCO
- CTL Wells
- ▼ Cooling Water Wells
- ⊗ SWDI Piezometers
- ▼ 2018 Piezometers
- ⊕ Operable Unit 2 (OU2)



Notes
1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Services - DigitalGlobe (6/19/2017)

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2019-01-08 Technical Review by NC on 2019-01-09
Client/Project	
City and County of Denver VB/I-70 OU2 Remedial Investigation	
Figure No.	
2	
Title	

Proposed Well Installation Locations
Figure 2

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ATTACHMENT 2

Summary of Historical Site Characterization and Updated Conceptual Site Model



**Summary of Historical Site
Characterization and Updated
Conceptual Site Model**

February 1, 2018

Prepared for:

City and County of Denver
Vasquez Boulevard and Interstate 70
Operable Unit 2
Denver, Colorado

Prepared by:

Stantec Consulting Services Inc.
2000 S Colorado Blvd Ste 2-300
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Sign-off Sheet

This document entitled Summary of Historical Site Characterization and Updated Conceptual Site Model was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of City and County of Denver (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by



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Reviewed by



Toby Leeson

Approved by



A. Robert Thompson

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Abbreviations

µg/dL	micrograms per deciliter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
ACM	asbestos containing material
AOC	Administrative Settlement Agreement and Order on Consent
ASARCO	American Smelting and Refining Company
bgs	below ground surface
CCoD	City and County of Denver
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	constituent of potential concern
CTE	Central Tendency Exposure
EMSI	Engineering Management Support, Inc
EU	Exposure Unit
GLO	Globeville Landing Outfall
GSL	Regulation Number 41 groundwater screening levels
HHRA	Human Health Risk Assessment
ID	identification
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams per kilogram
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
OU	Operable Unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
PM	particulate matter
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RSL	EPA Regional Screening Levels
SLERA	Screening-Level Ecological Risk Assessment
SVOC	semi-volatile organic compound
TCE	trichloroethene
TEPH	total extractable petroleum hydrocarbons
THQ	toxicity hazard quotient
TPH	total petroleum hydrocarbon
TWA	time weighted average
EPA	United States Environmental Protection Agency
VB/I-70	Vasquez Boulevard and Interstate 70
VOC	volatile organic compound



1.0 INTRODUCTION

This report provides a summary and evaluation of historical environmental and geotechnical investigations that have been performed within and near Operable Unit 2 (OU2) within the Vasquez Boulevard and Interstate 70 (VB/I-70) Superfund site. The VB/I-70 Superfund site is located in the north-central portion of Denver, Colorado near the intersections of Interstate 70 and Brighton Boulevard and consists of three Operable Units (OUs) (Figure 1). A Remedial Investigation (RI) of OU2 was conducted in 2008, as described in the report *Remedial Investigation, Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2 – On-Facility Soils Former Omaha and Grant Smelter* (Engineering Management Support, Inc. [EMS], 2009), referred to as the 2009 Remedial Investigation (RI). The 2009 RI was conducted in accordance with the *Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study* (AOC), CERCLA-08-2008-0011, for OU2 between the United States Environmental Protection Agency (EPA) and the City and County of Denver, Colorado (CCoD, the “Respondent”). In a letter dated August 28, 2017, the EPA notified CCoD of additional work they consider necessary to update the RI and accomplish the objectives of the RI/FS and requested that CCoD compile and incorporate the results of additional sampling that has been conducted at OU2 since 2008.

The objective of this report is to perform an evaluation of the existing data for OU2 to identify potential data gaps that will be used as a basis for developing a scope of work for an updated RI. After completion of this report, a technical memorandum will be prepared with a proposed scope of work for a revised RI for OU2.

The report is organized as follows:

- Section 1.0 Introduction – presents the report purpose and organization
- Section 2.0 Physical Setting – provides a brief overview of the land use, property ownership and physical characteristics of OU2
- Section 3.0 Summary of Existing Data – provides a summary of the investigations conducted to date within OU2
- Section 4.0 Quality and Usability of Existing Data – provides a summary of the quality and usability of the data relevant to OU2
- Section 5.0 Summary of Nature and Extent – provides a summary of the nature and extent of constituents of potential concerns (COPCs) at OU2 based on the existing data and historical knowledge
- Section 6.0 Conceptual Site Model – provides a summary of COPCs, likely sources of release of COPCs, release or transport mechanisms, secondary sources, pathways of exposure, and potential receptors for OU2
- Section 7.0 Potential Data Gaps – provides a summary of the conclusions and potential data gaps relevant to the RI based on review of the available data
- Section 8.0 References Cited – references cited in this document



2.0 PHYSICAL SETTING

2.1 LAND USE AND PROPERTY OWNERSHIP

OU2 consists of the area of the VB/I-70 Superfund Site formerly occupied by the Omaha & Grant Smelter facility. Figure 2 shows the extent of OU2 as defined by the EPA. The Omaha and Grant Smelters operated for approximately 21 years from 1882 until it closed in 1903. The smelter infrastructure was subsequently demolished, and slag was removed. A previous review of historic aerial photographs indicated that all visible slag was removed by 1949 (EMSI, 2009); however, some residual slag may be buried under the Denver Coliseum (Coliseum) parking lot. Between 1894 and 2012, portions of OU2 were deeded to CCoD, Union Pacific Railroad, the Pepsi Bottling Company, and various other corporate entities or individuals. Portions of OU2 were operated as a municipal landfill; however, specific information on periods of operation or the nature of landfill activities are unknown. The CCoD constructed the Coliseum circa 1950 which encompasses part of the northeast portion of the former Omaha and Grant Smelter facility. The Globeville Landing Park was constructed in the 1970s which encompasses part of the southwest portion of OU2 along the South Platte River (EMSI, 2009). A depiction of current site ownership is shown on Figure 3.

2.2 TOPOGRAPHY AND GEOGRAPHY

OU2 is bounded by Interstate 70 to the north, Brighton Boulevard to the southeast, 38th Street to the southwest, and the South Platte River to the west, which flows to the northeast (Figure 2).

The topography at OU2 is relatively flat, sloping slightly to the northwest towards the South Platte River. Elevations vary from approximately 5,200 feet above mean sea level (msl) along the northern boundary of OU2 to approximately 5,140 feet above msl within the flood plain of the South Platte River. A steep embankment is present east of McFarland Drive/Arkins Ct at the southern corner of the parking lot. A stormwater drainage feature, the Globeville Landing Open Channel and Outfall, was constructed in the Coliseum parking lot and the Globeville Landing Park in 2017 and 2018. Stormwater is diverted through two subsurface conduits into the open channel. One conduit was constructed through the Pepsi property under the Coliseum parking lot and is connected to the east end of the open channel and the other conduit is routed under the Pepsi property and connects to the west end of the open channel. The stormwater ultimately discharges into the South Platte River. Current ground cover across OU2 consists of asphalt pavement, concrete flatwork, exposed soil, and buildings; however, construction efforts are underway in the Globeville Landing Park to revegetate the exposed soils with grass, trees, and shrubs. The ground surface of McFarland Drive and the Coliseum parking lot is significantly undulating in the form of one to two-foot deep depressions. It is assumed that the undulating surface is due to differential settlement of the underlying fill and/or decomposition of material within the former landfill.

2.3 GEOLOGY AND HYDROGEOLOGY

OU2 is within the Colorado Piedmont section of the Great Plains east of the Front Range of the southern Rocky Mountains. The subsurface of this region consists of sedimentary rocks that form an asymmetric, north-south trending structural basin known as the Denver Basin. The Denver Basin aquifer bedrock sequence is approximately 2,000 feet thick and includes the Denver, Arapahoe, Laramie, and Fox Hills formations. OU2 is located above the Denver Formation within surficial, alluvial deposits overlying the bedrock (EMSI, 2009; URS, 2004).



SUMMARY REPORT – 2.0 PHYSICAL SETTING

The shallow alluvial aquifer is unconfined and generally composed of sand and gravel with varying amounts of clay and silt (EMSI, 2009). The depth to groundwater in the alluvial deposits ranges from 10 to 20 feet below ground surface (bgs) with elevations ranging between 5,161 feet above msl to 5,150 feet above msl. The recent construction of the open stormwater drainage channel through the Globeville Landing Park and Coliseum parking lot included the addition of sheet piling on the upgradient (southeast) side of the channel to reduce groundwater levels beneath the channel to maintain the integrity of the channel liner (EMSI, 2018). This has resulted in a slight rise in groundwater levels (one to two feet) immediately upgradient of the channel. In general, groundwater flows towards the South Platte with a subtle divide where groundwater flows more to the west through the Globeville Landing Park in the southern portion of OU2, and to the north through the Coliseum Parking Lot in the northern portion of OU2. An additional discussion of water level measurements and groundwater flow is provided in Section 5.3.1. Information for the groundwater monitoring wells and piezometers within and near OU2 is provided on Table 2-1.



3.0 SUMMARY OF EXISTING DATA

This section provides a summary of the existing available environmental data associated with OU2. The summary is organized into three categories as it relates to the previous 2009 RI: pre-RI, RI, and post-RI. For each investigation discussed, a brief overview of the findings is provided in the context of COPC concentrations relative to current screening criteria standards (referred to collectively as screening levels), with a more detailed evaluation of the data provided in Section 5. The screening levels used are presented in Table 3-1 and include EPA Regional Screening Levels (RSL) for a toxicity hazard quotient (THQ) of 0.1 for soils (residential and industrial), and Regulation Number 41 values (5 CCR 1002-41) for groundwater screening levels (GSLs) (EPA, 2018; CDPHE, 2016). In addition, arsenic soil concentrations are compared against the Region 8 EPA average background concentration of all land uses (11 mg/kg) (Colorado Department of Public Health and Environment [CDPHE], 2014). For the GSLs for inorganics, the values for Domestic Water Supply were used, and where none were available, the Agricultural Standards were used. In addition, when a range for the water quality standards was provided, the maximum contaminant level was used rather than the health-based standard.

3.1 PRE-REMEDIAL INVESTIGATION (1991 – 2008)

The existing available data from investigations conducted prior to the 2009 RI include data from 1991 up to the RI investigation in 2008. Investigations were conducted prior to 1991 as noted in the *Preliminary Assessment Omaha & Grant Smelter Site* report (Buckingham, 1992). However, these reports and the associated data were not available for review and the available pre-RI data are considered sufficient for this review. This section presents a summary of the pre-2009 RI site investigation activities that were performed within OU2, as follows:

- Site Investigations for I-70 Modifications (Walsh Environmental Scientists and Engineers, Inc. [Walsh], 1997)
- 2001 Denver Coliseum Cooling Water Wells Sampling Event (Severn Trent Services, 2001)
- 2001 and 2002 Pepsi Property Investigations (Transportation & Industrial Services, Inc., 2001a, 2001b, 2001c, and 2002)
- 2002 Globeville Landing Park Soil Sampling (CH2MHill, 2002)
- 2003 Denver Coliseum Barn Soil Excavations (CH2MHill, 2004)
- 2003 and 2004 Phase II Investigation for Targeted Brownfields Assessment (URS, 2004)
- 2004 and 2005 American Smelting and Refining Company (ASARCO) Soil and Groundwater Phase I Investigations (No official report for this investigation was developed; however, the data from the investigation is available in tabulated form)
- 2005 and 2006 Sediment, Surface Water, and Groundwater Investigations (Brown and Caldwell, 2005a and 2005b; CCoD, 2006a and 2006b)
- 2007 Denver Coliseum Cooling Water Wells Sampling

A summary of each of these investigations is provided in the following sections. The sample locations from these investigations that are relevant to OU2 are displayed on Figure 4.



3.1.1 Site Investigations for I-70 Modifications

The purpose of this study was to investigate environmental concerns as they related to the Phase I construction activities planned along I-70 from Washington Street to Humboldt Street (Figure 1) (Walsh, 1997). This included identification of potential environmental liabilities prior to property acquisition, and identification of areas where special handling and disposal may be required during excavations associated with the planned construction. Eight soil boreholes were drilled from 44th Street near the east end of the Denver Coliseum to the South Platte River (DC-1 through DC-8) advanced to the anticipated depth of excavation, or a maximum depth of six meters. Soil samples were collected from these boreholes and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and Resource Conservation and Recovery Act (RCRA) metals. Three of these boreholes, DC-2, DC-3, and DC-4, were completed as temporary monitoring wells, which were sampled for VOCs, SVOCs, metals, total extractable petroleum hydrocarbons, and general parameters.

Additionally, eight shallow soil boreholes to two meters total depth were advanced and sampled (WSSB-1 through WSSB08), but these are along North Washington Street outside of the boundaries of OU2. Since these locations are outside OU2, they are not considered representative of OU2 and are not depicted on Figure 4. This report also included a summary of water level and chemical data from boreholes installed previously by Walsh in 1991 (TH-1 through TH-18). However, only boreholes TH-1 through TH-5 and TH-8 and TH-9 are associated with OU2. Borehole locations TH-6, TH-7, and TH-10 through TH-18 collected as part of this investigation fall within OU1 and are therefore not displayed on Figure 4. The original reports for these data are not available at this time, so the full set of data associated with these borings and depths at which samples were collected are unknown (Walsh, 1991a and 1991b); however, metal soil and groundwater concentration data are available as an appendix to the 1997 report (Walsh, 1997). In addition, a summary of the VOC groundwater data associated with these borings in the 1997 report mentions that tetrachloroethene was detected at TH-9 at a concentration of six micrograms per liter (µg/L), which is slightly above the screening level of five µg/L. No other information regarding the VOC data associated with these borings is available.

Results from the I-70 modification investigations showed detections of select metals at concentrations above residential and industrial RSLs in soil. Concentrations of arsenic in soils from DC-2, DC-5, TH-2 and TH-3 were also above background. Additionally, results from the DC locations showed sporadic detections of petroleum hydrocarbons in soil and groundwater, and some sporadic low detections of SVOCs in soil and groundwater. These data are evaluated in more detail in Section 5 of this report.

3.1.2 2000 and 2001 Denver Coliseum Cooling Water Wells Sampling Event

In May of both 2000 and 2001 the CCoD collected water samples from the four wells that formerly provided cooling water for the Coliseum, QUAD-1 through QUAD-4. These wells are located at the four corners of the Coliseum. Water samples were analyzed for total (unfiltered) and dissolved (filtered) metal constituents (Severn Trent Services, 2001). Sample results showed low level detections of metals at concentrations below their respective GSLs.

3.1.3 2001 and 2002 Pepsi Property Investigations

Transportation and Industrial Service, Inc. performed several investigations for the Pepsi Bottling Group in the fall of 2001 and spring 2002, several of which included sampling areas within the OU2 boundary (Transportation & Industrial Services, 2001a, 2001b, 2001c, and 2002). The investigations of Pepsi Areas 2, 3, 4, 6, and 7 plus a utility trench investigation were conducted within the OU2 boundary. Pepsi Areas 1 and 5 are outside of OU2 and are therefore not



SUMMARY REPORT – 3.0 SUMMARY OF EXISTING DATA

discussed. The relevant soil sampling included collection of soils from 20 locations from Area 3 (A3-1 through A3-20) from the surface to two feet bgs, 16 locations from Area 4 (A4-1 through A4-16) from the surface to three feet bgs, six locations from Area 6 (A6-1 through A6-6) from the surface to 20 feet bgs, seven locations from Area 7 (A7-1 through A7-10) from the surface to six feet bgs, and 14 utility trench samples (UT-1 through UT-14) from the surface to 13 feet bgs. Soil samples were analyzed for arsenic and lead.

Sample results showed detections of arsenic at concentrations above the residential and industrial RSLs, as well as above background. Lead concentrations in soil were present at concentrations above the residential screening level and in a few cases above the industrial screening level. The Pepsi area reports have some information regarding soils removal suggesting that most of these soils are no longer in place; however, the specific locations and details of the soil removal work is unknown at this time. As such, the concentrations from these samples may not accurately reflect the current conditions at the Pepsi property within OU2.

3.1.4 2002 Globeville Landing Park Soil Sampling

The purpose of the 2002 Globeville Landing Park Soil sampling event conducted by CH2MHill was to evaluate the potential risks from smelter operation residuals to park workers during the performance of routine landscaping tasks (CH2MHill, 2002). Shallow subsurface soil samples were collected from 32 locations (SB-01 to SB-32) at depth intervals surface to two feet bgs, and two to three feet bgs at all locations, and from four to six feet bgs at four samples. The samples were analyzed for arsenic and lead and the study concluded that concentrations were not of concern and pose no unacceptable risks. These results were reviewed by the EPA, where they subsequently provided a No Further Action Letter for surface soils (i.e., surface to two feet bgs) at the Globeville Landing Park in April 2003 (EPA, 2003).

3.1.5 2003 Denver Coliseum Barn Soils Excavations

During a 2003 structural reinforcement for the Denver Coliseum Barn facility (Coliseum Barn) located on the west side of the Denver Coliseum, dark colored soil with evidence of slag and brick remnants from the former Omaha and Grant Smelter facility were uncovered just beneath the dirt floor. Eight excavations that occurred as part of the structural reinforcement work encountered this darker soil/slag material around four to five feet bgs (shown as 1 through 8 on Figure 4). Six composite subsurface samples from the eight excavations were collected (VB10220301 from 3 and 4, VB10220303 from 1 and 2, VB10220304 from 1 through 4, VB10220305 from 5 and 6, VB10220306 from 7 and 8, VB10220307 from 5 through 8) along with one grab sample of what appeared to be the most impacted (darker) material from the base of Excavation 3 (VB10220302). Additionally, a five-point composite sample of soil was collected from a stockpile from unknown origin to the west of the Denver Coliseum (may have originated from Coliseum operations). The samples were analyzed for arsenic, cadmium, chromium, lead, mercury, selenium, silver, and zinc. The arsenic concentrations were above the residential and industrial RSLs in the samples from the Coliseum Barn excavations, and also exceeded arsenic background in four of the six Coliseum Barn excavation samples. The stockpile sample had arsenic concentrations above the residential screening level, but below the industrial screening level. Lead was detected above its residential RSL in the grab sample from Excavation 3 at an estimated concentration, but all other detections of lead were below RSLs. No other metals were detected above the RSLs.

3.1.6 2003 and 2004 Phase II Investigation for Targeted Brownfields Assessment

The purpose of the 2003 and 2004 Phase II Investigation for Targeted Brownfields Assessment conducted by URS (URS, 2004) was to evaluate the environmental conditions along Brighton Boulevard located on the eastern edge of



SUMMARY REPORT – 3.0 SUMMARY OF EXISTING DATA

OU2 to help with the redevelopment and revitalization of the Brighton Boulevard corridor. Field activities were conducted in 2003 and 2004 and consisted of collection of soil samples from 75 locations, collection of 46 groundwater samples from open boreholes, and water level measurements. Soil and groundwater samples were analyzed for VOCs, SVOCs, total extractable petroleum hydrocarbons (TEPH), and metals. The locations sampled as part of this investigation that are within or proximal to the OU2 boundary are BB-BB-26 through BB-BB-37, BB-38-22, BB-38-25, and BB-CT-38 through BB-CT-40. Results for these locations showed detections of metals (including arsenic and lead) in soil above residential and industrial RSLs. Arsenic soil concentrations were also above background at eight of these locations. The groundwater metals data is limited to total metals, and therefore, not suitable for comparison to the GSLs which are intended for dissolved concentrations. VOCs were not detected in soil above residential or industrial RSLs. Groundwater from locations BB-BB-27 through BB-BB-34 and BB-CT-38 through BB-CT-40 were sampled for VOCs. VOCs were not detected above GSLs at locations along Brighton Boulevard (i.e., BB-BB's) except for BB-BB-26 located on the southeast corner of Brighton Boulevard and 26th Ave. This location contained detections of methylene chloride, cis-1,2-DCE, chloroform, bromodichloromethane, trichloroethene (TCE), and tetrachloroethene (PCE) at concentrations above their GSLs, with TCE and PCE at relatively high concentrations (700 and 4800 µg/L, respectively). Results for BB-CT-38 and BB-CT-39 to the north of the site showed elevated concentrations of PCE. TCE was also present at a concentration slightly above its GSL at BB-CT-38. SVOCs were detected above screening levels in both soil and groundwater at some of these locations. Results for the two locations to the southwest of the site showed detections of bromodichloromethane, TCE, and PCE above GSLs at BB-38-22, and detections of TCE above its GSL at BB-38-25. TEPH was detected in soil, but not detected in groundwater. Although there were some detections of constituents above screening levels in groundwater, the samples were collected from uncased open boreholes; therefore, the values for the various constituents are judged not to be reflective of in-situ conditions.

3.1.7 2004 and 2005 Soil and Groundwater Phase I Investigations

EnviroGroup under contract to ASARCO performed soil sampling for metals during 2004 and 2005 as part of an initiative to complete an RI and Feasibility Study for OU2. Sampling activities included:

- Composite surface soils from south and east areas of the Denver Coliseum parking lot (4600 Humboldt St.) and at various locations along Brighton Boulevard (3801, 4201, 4301, and 4375 Brighton Boulevard)
- Soil samples from various depths at seven soil boreholes dispersed throughout OU2 (BH-01 through BH-07)
- Installation of five groundwater monitoring wells within and near OU2 (MW-01, MW-02, MW-03, MW-05, and MW-06), and collection of surface and subsurface soils from the boreholes drilled for the monitoring wells

Figure 4 displays the composite surface soil sample locations as green hatched areas, but additional detail on the sample locations relative to the sample identifiers is provided in Appendix A which includes the historic figure developed as part of these investigations. This sampling was not formally documented as part of a report due to ASARCO's bankruptcy, and as a result the findings of this investigation were never summarized. A review of the data indicates the areal composite soil samples contained arsenic concentrations above RSLs and background. Areal composites from 4201 also contained lead concentrations above residential and industrial RSLs. Soil samples from the seven boreholes contained concentrations of arsenic, cadmium, and lead at concentrations above the residential and industrial RSLs. Soil samples collected from the monitoring well borings contained concentrations of arsenic and lead above residential and industrial RSLs. Arsenic concentrations were also above background in these samples.



3.1.8 2005 and 2006 Sediment, Surface Water, and Groundwater Investigations

Brown and Caldwell performed sampling of surface water and sediment for the CCoD to evaluate if the South Platte River had any potential impacts from OU2 (CCoD, 2006a and 2006b). The sediment and surface water samples were collected along the South Platte River from a location considered to be upstream of OU2 (N43) and a location considered to be downstream of OU2 (N46). Samples were collected on four occasions between November 2005 and July 2006 and were analyzed for metal constituents. The investigation report concluded there was no significant difference in metal concentrations between the upstream and downstream sediment and surface water samples. In addition, the five existing wells installed as part of the investigation conducted by EnviroGroup (MW-01, -02, -03, -05, and -06) were sampled for metals quarterly from November 2005 through July 2006 (Brown and Caldwell, 2005b, 2006a, and 2006b). Groundwater samples were collected for metals, SVOCs, polychlorinated biphenyls (PCBs), and diesel range organics from MW-02 and MW-03 in August 2005 (Brown and Caldwell, 2005a). The 2005 and 2006 groundwater sampling showed detections of dissolved arsenic above its GSL at MW-02 and MW-03.

3.1.9 2007 Denver Coliseum Cooling Water Wells Sampling

In August of 2007 the CCoD collected water samples from the four wells that provide cooling water for the Coliseum, QUAD-1 through QUAD-4. Water samples were analyzed for total arsenic. Sample results showed no detections of arsenic at QUAD-2, QUAD-3, or QUAD-4, and a low-level estimated concentration at QUAD-1 (0.01 mg/L).

3.2 REMEDIAL INVESTIGATION (2009)

The 2009 RI field work was conducted in December 2008 and consisted of drilling and coring sixteen (16) soil boreholes (SB-2-1 to SB-2-4, SS-3-1 and SS-3-2, SB-3-1 to SB-3-5, SB-4-1 to SB-4-5) and collection of soil samples for laboratory analyses. The sample locations associated with the 2009 RI are shown on Figure 4. A complete description of this work and the findings is provided in the 2009 *Remedial Investigation Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2 – On-Facility Soils* report (EMSI, 2009). A summary of the soil sampling conducted during this investigation is provided below.

Soil samples were collected at three to four different depths at each of the SB boreholes, and one surface sample between one to two feet below the asphalt was collected from the two SS locations and sampled for arsenic and lead. In addition, VOCs, SVOCs, and the full list of Resource Conservation and Recovery Act (RCRA) metals were analyzed for at samples collected from SB-3-2, SB-3-4, SB-3-5, SB-4-2, SB-4-3, and SB-4-4. The results of the soil sampling showed detections of arsenic and lead above residential and industrial RSLs, detections of cadmium above its residential RSL, no detections of VOCs above residential or industrial RSLs, and no detections of SVOCs. No additional groundwater samples were collected for the 2009 RI, because existing groundwater data at the time only showed the presence of arsenic above state and federal drinking water standards at one well (MW-02) and EPA had concluded that groundwater was not a significant exposure pathway (EMSI, 2009).

3.3 POST-REMEDIAL INVESTIGATION (2010 – 2017)

This section presents a summary of site investigation activities that were performed within OU2 between 2010 and 2017. These additional investigations were not conducted as part of the RI/FS, but were performed for other reasons, as described in the following subsections. These investigations included the following:



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- 2010 High Street Limited Subsurface Investigation (Brown and Caldwell, 2010)
- 2011 Limited Phase II Environmental Site Assessment (CTL Thompson, 2011)
- 2012 Groundwater Sampling (Pacific Western Technologies, Inc. [PWT], 2013)
- 2013 Supplemental Geotechnical Investigation (CTL Thompson, 2013a)
- 2013 Limited Phase II Environmental Site Assessment (CTL Thompson, 2013b)
- 2014 Groundwater Monitoring (PWT, 2014)
- 2015 Environmental Conditions Investigation, Storm Sewer System (EMSI, 2015)
- 2015 Supplemental Geotechnical Investigation (CTL Thompson, 2016a)
- Addendum 1 Data Summary of Environmental Conditions Investigations High Street Outfall (EMSI, 2016b)
- 2016 Soils Evaluation between Globeville Landing Park and the Denver Coliseum parking lot (CTL Thompson, 2016b)
- 2016 Addendums for Environmental Components of the Globeville Landing Outfall Project (EMSI, 2016c and 2016d)
- 2016 and 2017 Ambient Air Studies (Airtech Environmental Services, 2017a, 2017b, 2017c, 2017d, 2017e, 2017f, 2017g, 2017h; Weston Solutions, 2017a, 2017b)

A summary of each of these investigations is provided in the following sections. The sample locations established post-RI are displayed on Figure 5. Existing wells and surface water locations established during the previous years are not shown on Figure 5; however, some of these locations were sampled as part of the post-RI work, as discussed below.

3.3.1 2010 High Street Limited Subsurface Investigation

The purpose of the High Street Limited Subsurface Investigation (Brown and Caldwell, 2010) was to characterize the soil, groundwater, and soil gas to evaluate the potential for human and environmental health concerns resulting from the proposed construction activities related to the upgraded storm water sewer project near OU2. Eight soil boreholes, HS-01 through HS-08, were completed where soil samples were collected from intervals selected based on photoionization detector (PID) readings, and temporary groundwater monitoring wells were installed in all boreholes except for HS-06. The soil samples were collected from depths ranging from five to 25 feet bgs.

Soil samples were analyzed for VOCs, polycyclic aromatic hydrocarbons (PAHs), and metals. Acetone was the only VOC detected in the soil samples, which is common laboratory contaminant. Low levels of PAHs were detected in some of the samples. The soil samples showed detections of arsenic above the residential and industrial RSLs, but all were below background. Lead detections were all below the RSLs. Soil samples from boreholes HS-02, HS-03 and HS-08 were also analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Gasoline range organics were not detected, but diesel range organics were detected at low levels for each sample. PCBs were not detected in any samples.



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Groundwater samples were analyzed for VOCs, PAHs, and metals. VOCs were detected at concentrations greater than GSLs, including chloroform, TCE, and PCE. Low concentrations of PAHs were detected from HS-08. Barium and cadmium were the only two dissolved metals detected; cadmium was detected at concentrations above its GSL in HS-03 and HS-04.

Following the completion of soil and groundwater sampling at the boreholes, landfill gas monitoring was conducted at HS-01, HS-02, HS-03, HS-04, and HS-08 by drilling adjacent to the boreholes (within one to two feet) to the suspected depth of landfill materials and testing with a Landtec Gem 500® landfill gas meter. Methane was detected by the landfill gas monitoring in all wells except HS-04.

3.3.2 2011 Limited Phase II Environmental Site Assessment

The objective of the Limited Phase II Environmental Site Assessment conducted in 2011 (CTL Thompson, 2011) was to evaluate possible human health and environmental concerns related to the proposed construction activities associated with the western portion of the 40th Street Outfall. In addition, geotechnical data were collected during this investigation to support the planned outfall project. The investigation was conducted on March 30 and 31, 2011 and consisted of drilling 13 test holes, six of which were screened and sampled for environmental purposes and subsequently completed as groundwater monitoring wells and sampled. Six soil samples were collected at varying depths from the borehole locations TH-13, TH-14, TH-15, TH-17, TH-18, and TH-19, which were completed as wells CTL MW-01 through CTL MW-06. Soil samples were analyzed for VOCs, SVOCs, and metals. Groundwater samples were collected from the newly installed wells CTL MW-01 through CTL MW-06 and analyzed for VOCs, SVOCs, and metals.

The results of the soil sampling revealed low levels of a few VOCs from CTL MW-6 only. Arsenic was detected in all soil samples at elevated concentrations; however, the concentrations were not above the background concentration. Lead was detected in all soil samples at low concentrations. Low concentrations of cadmium were detected in some soil samples.

Groundwater samples revealed detections of chloroform, PCE, TCE, arsenic, cadmium, iron, and manganese at concentrations above GSLs at one or more of the well locations (see Section 5.3 for detail).

3.3.3 2012 Groundwater Sampling

Groundwater monitoring was conducted quarterly (March, May, August, and December) during 2012 to further assess groundwater quality near the historic landfill at OU2 and contribute data to be used in support of site characterization and identifying the potential need for future remediation (PWT, 2013). The groundwater monitoring consisted of collecting water level measurements and groundwater samples from five existing wells. These five wells were installed as part of the Phase I activities and include downgradient wells MW-01, MW-02, and MW-03 within the OU2 boundary, and upgradient wells MW-05 and MW-06 just outside the OU2 boundary to the southeast. Samples were analyzed for VOCs, SVOCs, and dissolved and total metals. Samples were analyzed in accordance with methods specified in the Quality Assurance Project Plan for OU2 (PWT, 2012). Results of the groundwater sampling revealed: detections of chloroform at concentrations above the GSL at MW-06 and detections of TCE and PCE at concentrations above GSLs at MW-01; detections of antimony, arsenic, iron, and manganese at concentrations above GSLs at well MW-02, and; SVOCs were either not detected or were detected at low concentrations below GSLs.



Light non-aqueous phase liquids (LNAPLs) were encountered in well MW-03 during well development and sampling. A sample of the LNAPL was analyzed by EPA Method 8015C, which indicated it consisted of carbon ranges associated with lubricating oil or grease.

3.3.4 2013 Supplemental Geotechnical Investigation

The purpose of the supplemental geotechnical investigation was to build upon previous investigations to support the 40th Street Outfall project (CTL Thompson, 2013a). Soil boreholes TH-1 through TH-10 were drilled in 2010 and this supplemental investigation involved an additional twenty boreholes (TH-11 to TH-30) to explore and evaluate subsurface conditions to support geotechnical design and construction criteria for the outfall. No environmental samples were collected as part of this effort, so they are not displayed on Figure 5. However, the results of the subsurface sampling provided information regarding the presence or absence of landfill waste materials. As such, select locations are displayed on Figure 6, which presents information on the potential extent of the landfill waste.

3.3.5 2013 Limited Phase II Environmental Site Assessment

The purpose of the 2013 Phase II investigation was to evaluate the nature of buried debris within the storm water construction path as related to the 40th Street Outfall project. Five test pits (TP1 through TP5) were excavated, primarily to investigate the potential to encounter asbestos containing material (ACM). Additionally, a PID was used for the field-screening of soils for volatiles from various depths within the test pits (CTL Thompson, 2013b). The test pits were approximately 10 feet long, two feet wide, and between 12 and 14 feet deep. PID readings were all low and did not indicate the presence of VOCs. All test pits contained suspect ACM which were submitted for polarized light microscopy analysis. Results from the analysis showed that each test pit had some amount of ACM ranging from 20 to 50 percent chrysotile and two samples contained amosite at five to 30 percent.

3.3.6 2014 Groundwater Monitoring

Sampling was conducted at ten wells (MW-01, MW-02, MW-03, MW-05, MW-06, and CTL MW-01, CTL MW-02, CTL MW-04, CTL MW-05, and CTL MW-06) near and within OU2 in first quarter 2014 to evaluate groundwater concentrations of arsenic, cadmium, iron, PCE, TCE, and cis-1,2-DCE (PWT, 2014). The results indicated arsenic, iron, PCE, and TCE above GSLs at one or more locations (see Section 5.3 for details). SVOCs were also sampled, but there were no detections above the GSLs.

3.3.7 2015 Environmental Conditions Investigation, Storm Sewer System

The 2015 field investigations were conducted to assess baseline environmental conditions to support design considerations for a storm water drainage feature to be constructed through a portion of OU2 of the VB/170 Superfund Site. Samples of waste material and subsurface condition information were collected from 16 boreholes identified as the Surface Water Design Investigation (SWDI)-series boreholes (EMSI, 2015). Solids (e.g., suspected landfill materials) and soil samples were collected from the boreholes for toxicity characteristic leaching procedure (TCLP) testing, total chemical constituents, and ACM analysis. Additionally, soil gas was monitored for total VOCs using a PID and oxygen and combustible gas levels, carbon monoxide, and hydrogen sulfide using a hand-held 4-gas meter during the borehole drilling and sampling activities.



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Temporary piezometers were installed in 15 of the 16 SWDI-series boreholes (SWDI-11 was not completed at a piezometer since existing well CTL MW-06 adjacent to the borehole was available for monitoring). Groundwater levels and samples were collected from all 15 piezometers along with CTL MW-06, MW-01, MW-02, and MW-03. Groundwater samples were analyzed for metals, inorganics, and VOCs.

Arsenic and lead were detected in soil samples from all 16 boreholes, with the highest concentrations detected in boreholes SWDI-4, SWDI-5, SWDI-9, and SWDI-10. Some PAHs were detected above RSLs and some VOCs were detected, but concentrations were below the RSLs.

Arsenic, cadmium, chromium, iron, lead, manganese, silver and uranium were detected in the groundwater samples; however, arsenic and uranium results were limited to total metals analysis. Analysis of the dissolved metal results relative to the GSLs is provided in Section 5.3. The VOCs benzene, PCE, TCE, and vinyl chloride were also detected in the groundwater samples.

3.3.8 2015 Supplemental Geotechnical Investigations

The purpose of the supplemental geotechnical investigation was to build upon previous investigations to support the 40th Street Outfall project (CTL Thompson, 2016b). Soil boreholes TH-1 through TH-30 were previously drilled in 2010 and 2013, and this supplemental investigation involved an additional ten boreholes (TH-31 to TH-40) to explore and evaluate subsurface conditions to support geotechnical design and construction criteria for the outfall. No environmental samples were collected as part of this effort, so they are not displayed on Figure 5. Information from these locations may be useful for evaluations of subsurface geology relating to potential migration pathways and can be revisited during the RI.

3.3.9 Addendum 1 Data Summary of Environmental Conditions Investigations

Twelve additional exploratory boreholes (TH-41 to TH-52) were completed in December 2015 to supplement the previous investigations (EMSI, 2016b). In five of the boreholes located along the western bank of the Globeville Landing Park (TH-45, TH-46, TH-47, TH-48, and TH-52), the approximate elevation and depth to bedrock and groundwater were evaluated, and temporary monitoring wells were installed. The other seven boreholes were drilled to assist in evaluation of the soils for environmental planning purposes; however, no environmental samples were collected for chemical analysis from these borings, and as a result they are not displayed on Figure 5. Groundwater samples were collected at TH-45, TH-46, TH-47, TH-48, and TH-52 and analyzed for metals and VOCs. Groundwater analytical results were as follows:

- Arsenic, cadmium, iron, lead, manganese, selenium and uranium were detected
- PCE was detected at elevated concentrations in samples from all five piezometers
- TCE was detected at elevated concentrations in samples from all five piezometers

3.3.10 2016 Soils Evaluation between Globeville Landing Park and the Denver Coliseum Parking Lot

The purpose of this investigation was to evaluate the subsurface conditions and shallow soil quality in the tract of land in between Globeville Landing Park and the Denver Coliseum parking lot (CTL Thompson, 2016b). As part of this effort, 13 soil boreholes were completed (TH-53 to TH-65). Soil material was collected from the top five-foot interval from



boreholes TH-61 through TH-65. No soil samples were collected from TH-53 to TH-60, and as a result these locations are not displayed on Figure 5. The analytical results for arsenic and lead indicated that arsenic concentrations were above the industrial and residential RSL in all samples, and also above background in all locations but TH-62, and lead concentrations were above the residential RSL at TH-61 and TH-65. Soils were also screened during drilling for volatiles using a PID. No PID readings were detected above one part per million by volume at any of the sampled intervals.

3.3.11 2016 Addendums for Environmental Components of GLO Project

Soil sampling was conducted in October of 2016 within the Globeville Landing Park to characterize lead and arsenic levels in the upper three feet of proposed finished grade soils to determine if these proposed surface soils exceed lead or arsenic cleanup action levels (EMSI, 2016d). As part of this effort, nine shallow boreholes (SWDI-43 through SWDI-51), and twenty-six deeper boreholes (SWDI-17 through SWDI-42) were drilled. Three composite samples were collected from each of the shallow boreholes, and one composite sample was collected from each of the deeper boreholes. Samples were analyzed for arsenic and lead by Method 6010C. Sampling results from these composite soil samples indicated the following:

- Lead was detected at elevated concentrations in soil samples from SWDI-17, -39, -42, -43, and -51
- Arsenic was detected at elevated concentrations in soil samples from SWDI-43 and -51

In addition to the soil sampling, two 4-inch diameter wells were installed in the Globeville Landing Park (PW-1) and the Coliseum parking lot (PW-2) to conduct aquifer testing to determine the horizontal hydraulic conductivity and specific yield of the aquifer materials (EMSI, 2016c). As part of this aquifer testing, groundwater quality was examined to assess any potential changes during the pump tests. The groundwater quality analysis included sampling for metals and general chemistry.

3.3.12 2016 and 2017 Ambient Air Studies

Airtech Environmental Services (now Montrose Environmental Group, Inc.) was contracted by the CCoD to perform ambient air studies at the Globeville Landing Outfall (GLO) site (Airtech Environmental Services 2017a through 2017h). The studies were performed in late 2016 and early 2017 with the specific objectives to determine the concentration of particulate matter with a nominal diameter of 10 microns or less (PM₁₀) at each of four sampling locations and analyze a fraction of the filters for arsenic and lead.

Additionally, during 2017, EPA and their contractor Weston Solutions conducted several particulate air monitoring events at the OU2 site to support the Time Critical Removal action for the GLO construction (Weston Solutions, 2017a and 2017b). During this period, no exceedance of the 24-hour time weighted average (TWA) for PM₁₀ occurred at the construction perimeter fence line. The PM_{2.5} TWA was below the National Ambient Air Quality Standards (NAAQS) for the duration of the monitoring event as well.

Several ambient air studies were conducted in 2017 for PM₁₀ that included arsenic and lead evaluations as well. The sampling indicated that both arsenic and lead remained below the EPA allowable air concentrations for residential receptors.

Air monitoring at OU2 for the GLO project, which included PM₁₀, arsenic, and lead, concluded in August 2018. These data may be useful and can be included in subsequent evaluations conducted as part of the RI.



4.0 QUALITY AND USABILITY OF EXISTING DATA

4.1 QUALITY OF DATA SOURCES

Data from many of the previous investigations discussed under Section 3 were evaluated. This included data summary tables, field notes/forms, and lab reports from the previous investigation reports referenced above. In addition, tabulated analytical data were provided in the form of Excel® spreadsheets and Access® databases. The combination of the various data sources was used to conduct the evaluations presented in Section 5.

The data that were evaluated included soil, sediment, surface water, and groundwater chemical analytical data and groundwater level data. In general, the large number of data sources and inconsistent data handling practices from the various sources from which the tabulated data were compiled resulted in usability challenges. Specific challenges with the quality of the tabulated data and how they were resolved are described below:

- **Depths:** Soil sample depths were not populated in many cases. The reports from the investigation(s) where these samples were collected were referenced when available to populate the missing depth fields. If the depth for a sample considered important to include in the evaluation could not be resolved (e.g., historical report did not include the information, or the report was unavailable), the sample was included, and its depth noted as “unknown” in the text and tables where results are presented.
- **Duplicate results:** Sample results are identical with the only difference being in the laboratory qualifier field. When available, laboratory reports and data quality reports were reviewed to select the appropriate results and qualifier to use.
- **Dates:** Sample dates were missing in several cases for the soil and groundwater data making it difficult to link the data to an investigation, particularly when multiple investigations used the same sample identifications (IDs) (e.g., TH boreholes). The results presented in the investigation reports that contained sample location IDs that matched those without dates were reviewed to resolve the unknown dates.
- **Redundancy in Sample Identifiers:** Multiple investigations used the same or similar sample IDs (e.g., TH boreholes). The investigations using the same sample IDs were reviewed to resolve which data were relevant to and sample IDs were modified to make unique as needed.
- **Results Errors and Uncertainty:** Some issues were identified with incorrect sample IDs linked to data that should be associated with another sample ID when the laboratory report is referenced. Several cases were identified when spot checking groundwater data against laboratory reports and summary reports where data that are non-detect are listed in the database as the reporting limit with no qualifier, so it appears as a detection. There was also uncertainty surrounding the total and dissolved metals data for groundwater since some laboratory reports show them as total, but the database showed two results with one listed as total and the other as dissolved. To resolve these data issues, the investigation and laboratory reports were referenced. Most reports provided information on whether samples were field filtered, which allowed correction of total metals results to dissolved metals.
- **Missing Data:** As mentioned above, some of the data were only partial and compilation of all sources did not complete the set. For evaluation of data that were incomplete or missing from the tabulated sources, the previous investigation reports were reviewed, and relevant results were hand entered into the database.



- **Inconsistent Sample Location Identifiers:** Some of the IDs do not align with the reports and have varied nomenclature throughout the database but refer to the same location. The investigation and laboratory reports were referenced to verify that the IDs were referencing the same location and results were presented under one sample ID for this report.
- **Unknown Symbols:** some of the data were flagged with a “?” or “A”. These appeared to have been added during data handling and management (i.e., not a product of the laboratory reports). The meaning of these is unknown. Reference back to the laboratory reports could not identify the meaning of these; therefore, they were not used in the presentation of data for this report. Instead the qualifiers provided with the original investigation and laboratory reports were used.

In summary, despite challenges with the tabulated data, several of the investigation reports provided data tables and laboratory reports that helped to resolve some of the uncertainty around the data. However, some previous data or reports were not available to resolve all data challenges listed above. Specifically, depths for the soil sampling from the I-70 test boreholes described in Section 3.1.1 were unable to be resolved because the original reports that disclose those details are unavailable.

The data incorporated into the database described in the next section and summarized in this report are considered usable for summarizing the results of the previous investigations and evaluating potential data gaps for the RI. Data that are complete and meet the minimum requirements for data quality will be usable for the updated RI, other data may be considered screening level data and cannot be used in the RI. The data included in the project database will be annotated to indicate its level of usability (i.e., screening level data or RI data). No data are considered unusable.

4.2 PROJECT DATABASE

The data described above that are related to OU2 were compiled into a central database using Oracle®. Not all data issues were resolved due to the inability to link some previously compiled data to a source, or the effort required to resolve the issues outweighed the relative benefit it provided for the evaluation. Instead, data that were identified as key to the understanding of the nature and extent of contaminants were selected for additional quality evaluations to confirm accurate representation in the database. The evaluation of some data that was considered important required referencing summary reports and laboratory reports, as it was not included in the available electronic, tabulated data.



5.0 SUMMARY OF NATURE AND EXTENT

This section of the report provides an evaluation of the nature and extent of COPCs within OU2. Only data within or proximal to the boundary of the OU2 were evaluated. This section is divided by media type, where various COPCs are discussed for each. This evaluation included a review of historical (pre-RI and 2009 RI) and recent (post-RI) data.

5.1 LANDFILL/WASTE MATERIAL

Prior to construction of the Denver Coliseum, the area of the Coliseum parking lot and possibly other portions of OU2 were used as a landfill for disposal of municipal solid wastes (EMSI, 2009). The 2009 RI report (EMSI, 2009) provided a characterization of the nature and extent of the landfill/waste material (landfill material). The lateral extent of the landfill material was shown to extend just to the edges of the Coliseum parking lot and no further, as shown on Figure 27 of the 2009 RI report and on Figure 6 of this report. The extent was based on the following:

- The northern, northeastern, and western boundaries were based on an absence of landfill material encountered in boreholes located in these areas, and on relatively uniform surface topography observed outside of the inferred boundary of the extent of landfill material in these areas
- The southwestern and southeastern boundaries were based on the limits of the undulating surface of OU2 (e.g., the surface of the Coliseum parking lot)

Figure 6 also shows pre-RI, 2009 RI, and post-RI boreholes along with the landfill material thickness in feet that is shown on the individual borehole logs. Some of the borehole logs are just summary graphs of the logs, and not the actual field logs, and as a result lack site-specific detail. However, the graphical logs do provide general descriptions that indicate where landfill material was observed.

Subsurface sampling that was conducted after the 2009 RI suggests that the landfill material extends beyond the edges of the Coliseum parking lot, particularly outside the northeastern and southeastern boundaries. The subsurface sampling locations (boreholes and test pits) that were used to evaluate the extent of landfill waste at OU2 are shown on Figure 6 including borings advanced during and after the 2009 RI which provided additional information regarding the extent of landfill material.

The northeastern boundary of the landfill material shown in the 2009 RI report was based on one subsurface sampling location (SB-3-1). The SB-3-1 borehole indicated “trash” was observed from 3.5 to 4 feet bgs with alluvial soil below that to the total depth of the borehole at 14 feet bgs. However, the borehole log for the ASARCO monitoring well MW-03 located approximately 180 feet east of SB-3-1 indicated the presence of “fill material” to the total depth of the borehole at 20 feet bgs. The fill material was described as containing gray and black silt with sand and gravel mixed with brick, wood, glass, newspaper, and metal, with a petroleum odor starting at approximately 5 feet bgs. Figure 27 of the RI report indicates that the landfill material was not present at the location of MW-03 with a zero-thickness line shown 50 feet southwest of this location. The historical 1997 data from the DC boreholes were also reviewed given their proximity to the northern and eastern boundary of the landfill extent depiction provided in the 2009 RI. The log for DC-3, just north of MW-03, indicated intermittent layers of trash down to 20 feet bgs, and DC-4, at the north boundary of the 2009 RI depiction, indicated trash down to 11 feet bgs. The log for DC-7 to the west of the OU2 boundary showed some indication of possible landfill debris; however, rather than noting trash, the log indicates glass, brick, and metal



debris down to 6.5 feet bgs. In addition, the boring log from DC-5 to the east of DC-7 and closer to the OU2 site boundary did not indicate any landfill or building debris waste, so the materials observed at DC-7 are unlikely to be representative of the municipal waste landfill.

The southeastern extent of the landfill waste material, which was based on the extent of the undulating ground surface within the Coliseum parking lot, is shown to run along McFarland Drive (see Figure 6) and is depicted as the zero-thickness line of the landfill material in the 2009 RI report. However, there are several boreholes in that area that were conducted during the subsequent studies that were located outside of the boundary of the previous depicted extent shown in the 2009 RI Report, including: HS-03, TH-7, and TH-16 that describe landfill material at least 15 feet thick, some thicker (TH-16 indicated landfill material up to 29 feet thick). Borehole BH-03, which was advanced in 2004, prior to the 2009 RI, also indicated the presence of landfill material beyond the extent shown in the RI Report.

Just inside the southeastern boundary of the landfill material, the 2009 RI report indicates a landfill material thickness of approximately 5 feet bgs. However, more recent boreholes in that same area (i.e., CTL MW-04 (TH-17), SWDI-1, SWDI-2, and TH-8) indicated landfill material thicknesses of 14 to 27 feet. TH-8 and CTL MW-04 (TH-17) also exhibited a strong chemical or petroleum odor.

The southwestern boundary of the landfill material is shown in the 2009 RI report as a zero thickness along Arkins Drive and the edge of the Coliseum parking lot. However, more recent boreholes in that area indicated landfill material thicknesses up to 28 feet thick (i.e., SWDI-10).

The results of the subsurface soil sampling from the 2009 RI and more recent investigations indicate that landfill material is thicker in places and is more laterally extensive than what was shown in the 2009 RI report.

5.2 SOIL - METALS, VOCS, SVOCS

5.2.1 Previous Work and Excavation Considerations

Soil sampling locations evaluated as part of this nature and extent discussion are depicted on Figure 7 and include locations from the pre-RIs, 2009 RI, and post-RIs. Previous investigations of surface soil in the Globeville Landing Park resulted in a letter from the EPA acknowledging no unacceptable risk exists for the surface soils (surface to two feet bgs) at the Globeville Landing Park (EPA, 2003). As a result, soil results collected from the shallow interval within the Globeville Landing Park were not considered as part of this evaluation. Excavations of soils within the Globeville Landing Park that occurred after 2002 as part of the GLO project were queried against the remaining samples collected at depths below two feet. In addition, excavation information from the recently upgraded stormwater conduit system routing from Brighton Boulevard through the Coliseum parking lot were also reviewed against sample locations and depths to identify those soils no longer in place. Drawings of the excavation extents and depths were provided by the GLO project team to allow for spatial comparison to the pre-RI, 2009 RI, and post RI sample locations. These drawings are provided as Appendix B for reference. If a sample location fell within an excavation area and the sampling interval fell within the excavation interval depths, the soil was assumed as not in place and not evaluated as part of this nature and extent discussion. The areas where excavations were conducted as part of the GLO project are shaded blue in Figure 7.

Other previous work that was considered was the 2001 and 2002 Pepsi Property Investigations (Transportation & Industrial Services, Inc., 2001a, 2001b, 2001c, and 2002). The soils sampled during these investigations are not likely



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in place due to excavation activities conducted as part of the various projects; however, the documentation does not provide specific information on the removal actions. As a result, the Pepsi area sampling data from within the OU2 boundary were included in this section for completeness, but concentrations are not likely representative of current conditions.

The available soils data that were not eliminated based on the above criteria were split into different depth categories to evaluate the vertical delineation of COPCs. These categories are defined as follows:

- Shallow soils – surface to approximately two feet bgs.
- Subsurface soils – soils between two and ten (10) feet bgs. This category also included sample results for which composites were collected from varying depths going past two feet (e.g., depth was reported as zero to 20 feet).
- Deep soils – samples collected from intervals with a top depth of 10 feet or greater. Results from these depths should be considered with the understanding that many of these reach into the saturated zone and may not be representative of vadose zone soil conditions.

The seven I-70 boreholes had unknown depths (TH-1 through TH-5, TH-8, and TH-9) and were grouped with the subsurface soil depth category for this discussion. A summary of the soil sampling results is provided by chemical groups below. Results are discussed in terms of the EPA RSLs and arsenic background value presented in Table 3-1.

5.2.2 Metals

The primary metals of potential concern at OU2 based on sampling results collected to date and historical use include arsenic and lead; therefore, arsenic and lead are discussed individually. Metals other than arsenic and lead were evaluated for completeness and are discussed together at the end of this section.

Table 5-1 summarizes the arsenic and lead soil sampling and indicates arsenic and/or lead results that exceeded the RSLs (residential and industrial). In addition, arsenic is compared to its background value. Figures 8a through 8c show the spatial distribution of arsenic concentrations in soil and Figures 9a through 9c show the same for lead. For these figures, areal composites are not shown for simplicity, since they are tied to multiple locations (e.g., Coliseum Barn excavation composite samples); however, Table 5-1 includes all soil results (depth discrete, depth composites, and areal composites). A discussion of these results is summarized below for each metal.

5.2.2.1 Arsenic

Shallow soils contained detected arsenic concentrations that ranged from 1.4 mg/kg at SB-2-1 to 510 mg/kg at BH-07. Detections were all above the residential RSL of 0.68 mg/kg with most concentrations also above the industrial RSL of 3.0 mg/kg. The background value for arsenic was exceeded at 21 of the locations shown on Figure 8a. The highest detections in the shallow soils occurred at BH-07 and BH-06 near the Forney Museum (see Figure 8a).

Subsurface soils contained detected arsenic concentrations that ranged from 0.3 mg/kg at TH-1 (a location with unknown depth) to 630 mg/kg at UT-7. Results showed concentrations above the residential and industrial RSLs, with 42 of the locations shown on Figure 8b with concentrations above background. The highest detections occurred at UT-7 and BH-05 near the southeastern edge of the site, MW-06 outside the OU2 boundary to the southeast, and at Pepsi Area 4 sampling locations A4-1, A4-4, and A4-8 (see Figure 8b).



Deep soils contained the highest detected concentrations ranging from 0.27 mg/kg at SB-2-3 to 1500 mg/kg at BH-03. All but one of the arsenic detections in deep soils were above the residential RSL with the majority also above the industrial RSL. Arsenic concentrations were above background at 23 locations. The highest detections occurred at BH-03 at depths from 10 to 20 feet bgs, and at BH-01 at 24 feet bgs, suggesting these samples were in the saturated zone (see Figure 8c).

These data show elevated arsenic detections in shallow, subsurface, and deep soils. The highest detections were present at depths near or within the saturated zone. This could be an artifact of arsenic groundwater concentrations in that area or could indicate the presence of residual materials from smelter operations at depths near the water table. Elevated detections of arsenic occur throughout the footprint of OU2; however, the data density at the center of the Coliseum parking lot is sparse, making it difficult to discern if impacts at levels above background are contiguous (Figures 8a, 8b, and 8c). There is some indication from the Pepsi Area 3 sampling along the southeast boundary of the Pepsi parking lot that arsenic impacts are not present in shallow soils in this area (see black colored sampling locations on Figure 8a indicative of no arsenic detections); however, concentrations further east and south within the boundary contained concentrations above background during the Pepsi sampling efforts. Subsurface and deep soils that are considered in place in the central portion of the Globeville Landing Park contain arsenic at levels below background; however, samples in the south, north, and east of the park had some detections above background.

5.2.2.2 Lead

Shallow soils contained detections of lead above the residential of 400 mg/kg RSL at 9 locations shown on Figure 9a. Concentrations were also above the industrial RSL of 800 mg/kg at five of these locations. The concentrations above the screening level ranged from only slightly above the residential RSL at 430 mg/kg at A3-10 to 34,000 mg/kg at BH-06; however, the majority of shallow soils contained lead concentrations below the RSLs (see Figure 9a).

Subsurface soils contained detections of lead above the residential RSL at 21 locations. Concentrations were also above the industrial RSL at 10 of these locations. The concentrations above the screening level ranged from only slightly above the residential RSL at 410 mg/kg at DC-8 and A4-13 to 3,600 mg/kg at MW-02; however, most subsurface soils contained lead concentrations below the RSLs (see Figure 9b).

Deep soils contained detections of lead above the residential RSL at 12 locations. Concentrations were also above the industrial RSL at six of these locations. The concentrations above the screening level ranged from only slightly above the residential RSL at 410 mg/kg at A6-4 to 100,000 mg/kg at BH-03; however, most of the deep soils contained lead concentrations below RSLs. The highest detections occurring at BH-03 and A6-6 were at depths indicative of the saturated zone (see Figure 9c).

These data show sporadic elevated lead detections in shallow, subsurface, and deep soils. The presence of lead in soil does not mirror that of the arsenic results discussed above. There is no observed concentration trend in the data vertically and lateral impacts do not appear to be contiguous. However, lead exceedances occurred more frequently in the shallow and subsurface soils and only appear elevated in deep soils in samples in the southern portion of the parking lots and just south of the parking lots (e.g., BH-01). Elevated detections of lead occur throughout the footprint of the OU2, but exceedances appear sporadic (not clustered in distinct areas). The data density within the Coliseum parking lot is sparse, making it difficult to discern if impacts are contiguous.



5.2.2.3 Other metals

Soil samples included in this evaluation were also analyzed for other metals with the scope varying depending on the investigation. These additional metals results are summarized on Tables 5-2a through 5-2c. Concentrations of these metals were compared to the EPA residential and industrial RSLs, except for calcium, potassium, and sodium as no RSLs are available for these.

A subset of these other metals had detections above residential RSLs. Only cadmium, iron, manganese, and thallium were detected above their industrial RSLs and these detections were limited to a few results.

5.2.3 VOCs and SVOCs

Soils from a subset of the locations depicted on Figure 7 were analyzed for VOCs and SVOCs (e.g., 2009 RI, 2010 High Street, 2011 Phase II Site Assessment, and 2015 Investigation for Stormwater Drainage investigations). A summary of the results is provided below.

5.2.3.1 VOCs

The detected VOC soil results from these sample locations are presented in Table 5-3. A few locations had detections of VOCs in subsurface and deep soils; however, no detected concentrations were above residential or industrial RSLs. Additionally, the VOC detections were predominantly estimated concentrations (flagged with a J qualifier). The remaining VOC results showed no detections and VOCs were not detected in shallow soils.

5.2.3.2 SVOCs

The detected SVOC results from these sample locations are presented in Table 5-4. A few locations had detections of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene above residential RSLs in subsurface and deep soils; however, none of the concentrations exceeded the industrial RSLs. One location, SWDI-10 also had a detection of indeno(1,2,3-c,d)pyrene at a concentration equal to its residential RSL. The remaining sample results showed SVOCs were either not detected or detections were below the RSLs.

SVOCs were not detected in shallow soils; however, the shallow soil sampling for SVOCs was limited to one location (TH-18). Additionally, SVOC detections appear to occur within the samples collected in the southern portion of the parking lots (e.g., HS and SWDI locations) and the northern portion of OU2 (e.g., DC locations). The 2009 RI samples collected within the Coliseum parking lot show either no detections or sporadic low-level detections (e.g., SB locations).

5.2.4 Total Petroleum Hydrocarbons

Subsurface and deep soil samples collected as part of the I-70 Modifications Investigations (DC locations) and the 2010 High Street Investigation (HS-02, HS-03, and HS-08) were analyzed for petroleum hydrocarbons (see Figure 7). A summary of the TPH results are presented in Table 5-5. Gasoline range organics were not detected. Diesel range organics were detected at DC-3 through DC-8, HS-02, HS-03, and HS-08. Concentrations in the DC locations ranged from 24 mg/kg at DC-8 to 1400 mg/kg at DC-4. The more recent sampling for the 2010 High Street Investigation showed concentrations from 219 mg/kg to 248 mg/kg. Additionally, petroleum odors or visible free product were noted or observed on the borehole logs for several boreholes on or near the northern and southeastern boundaries of OU2 (e.g.,



SB-4-2, MW-02, MW-03, TH-7, TH-8, TH-17 and TH-18). Widespread soil sampling for TPH has not been conducted at OU2, and as such, potential impacts cannot be vertically or laterally delineated.

5.2.5 Other Constituents (Pesticides and PCBs)

Subsurface and deep soil samples collected as part of the 2010 High Street Investigation (HS-02, HS-03, and HS-08) were analyzed for pesticides and polychlorinated biphenyls (PCBs). No detections of PCBs were observed as shown in Table 5-6. The pesticides were also not detected except for 4,4-DDD at HS-02, and gamma-chlordane, 4,4-DDD, and 4,4-DDE at HS-08 as shown in Table 5-7. All detections were below the residential and industrial RSLs.

5.3 GROUNDWATER

Groundwater sampling locations evaluated as part of this nature and extent discussion are depicted on Figure 10. The sample locations included in the evaluation are described in the more detail in the following section.

This nature and extent evaluation for groundwater provides an overview of the historical and existing groundwater wells at and near OU2 and their location relative to the hydraulic gradient and the property. Additionally, a review of all available analytical groundwater data is provided. Results are summarized in terms of historical (pre-2009 RI) and recent (post-2009 RI) data to allow for an understanding of historical concentrations compared to current conditions. For the purposes of this discussion, all groundwater results were compared to the GSLs presented on Table 3-1.

5.3.1 Groundwater Wells and Water Levels

Numerous monitoring wells, piezometers, and temporary wells have been installed in or near OU2 in the past, as shown in Table 2-1 and on Figure 10. There are currently three existing monitoring wells (MW-02, CTL MW-04 and CTL MW-05) and five piezometers (SWDI-5, SWDI-6, PZ-1, PZ-2, and PZ-3). Additionally, there are four existing wells that were historically used for cooling water at the Coliseum building that have been sampled for chemical analysis (QUAD-1, -2, -3, -4). MW-01 and MW-03 were existing until recently when they were inadvertently abandoned in June 2018 during construction activities associated with the National Western Complex. The remainder of the wells and piezometers were abandoned or were destroyed during other construction activities that have occurred in or near OU2. A list of the wells that were used to collect groundwater samples and water levels on or near OU2 is included in Table 2-1. Table 2-1 also summarizes the well construction details and indicates the locations of the wells.

The 2009 RI assumed the direction of groundwater flow to be from southeast to northwest with groundwater discharging to the South Platte River, since the wells that were present at that time had not been surveyed. Information collected since the 2009 RI indicates that groundwater flows towards the South Platte with a subtle divide where ground flows westerly through the Globeville Landing Park in the southern portion of OU2, and to the north through the Coliseum parking lot in the northern portion of OU2. Water level measurements indicate that groundwater levels are approximately 10 to 20 feet bgs at elevations from approximately 5,161 feet above msl to 5,150 feet above msl; with the lowest elevations measured in MW-01 at around 5,150 feet above msl. A potentiometric surface map (groundwater elevations) that was developed based on water levels measured in 2015 indicated that the direction of groundwater flow beneath the Coliseum parking lot was to the north-northwest (EMSI, 2016a). This map is provided in Appendix C for reference. Additionally, quarterly monitoring of water levels in 2012 indicated that the water table only fluctuates slightly due to seasonal effects (PWT, 2013).



Groundwater flow through OU2 has recently been affected due to the construction associated with the GLO project. The GLO project included excavation of soils (at depth in certain areas) and installation of an impermeable barrier system (e.g., compaction grout columns, Vibro-stone columns, a strengthening layer, and a geomembrane liner), as described in the report *Final Design Report, Environmental Components for Globeville Landing Outfall Project* (EMSI, 2016a). Additionally, during the excavations, the base of the Delgany sanitary sewer lines were exposed and a flowing underdrain layer consisting of gravel approximately 1.5 feet thick was discovered along with a leaking nine-inch diameter clay pipe within the underdrain. This sanitary sewer containing high hydraulic conductivity materials runs through the western portion of OU2. These features likely create a preferential flow path for groundwater and additional consideration for their impact on the overall gradient is recommended.

The long-term impacts to the potentiometric surface due to the GLO project were modeled, and the results indicated that the re-equilibrated water levels and groundwater flux through the fill materials will be lower in the southwestern part of the Coliseum parking lot downgradient of the sheet piles. Model simulations also showed a slight increase in flux from the fill beneath the Coliseum parking lot overall following completion of the GLO project, partially due to the change in recharge conditions associated with the northern segment of the clay pipe beneath the Delgany sewer line (EMSI, 2018).

Stantec conducted a field assessment of the existing groundwater monitoring wells and piezometers in 2018 and observed that the elevation of the ground surface at some locations appears to have changed due to differential settlement of the ground surface, especially within the Coliseum parking lot, which is where the former municipal landfill was located.

5.3.2 Dissolved Metals

Results for dissolved metals were reviewed against the available GSLs. Total metals data is also available for many of the investigations and in some cases only total metals data is available; however, these results are not discussed since the screening criteria used for the evaluation is intended for use with dissolved results. A review of total metals data can provide additional insights and can be revisited during the RI.

5.3.2.1 Historical Data (prior to 2010)

The dissolved metals results for wells sampled prior to the 2009 RI are presented in Table 5-8 and summarized below.

Arsenic

Dissolved arsenic concentrations were detected above the GSL of 10 µg/L at DC-3 and DC-4 during the 1997 sampling, MW-02 during 2005 and 2006 sampling, and once at MW-03 during 2005 sampling. In addition, the 1997 sampling showed a concentration at DC-2 equivalent to the GSL. All other results were either not detected or were detected below the GSL. The highest detected concentrations occurred at MW-02 where they ranged from 63 µg/L to 150 µg/L.

Lead

Dissolved lead concentrations were not detected above the GSL of 50 µg/L in historical results. The highest detected results were still well below the GSL at 6 µg/L at upgradient well MW-06 in 2006, and 2.6 µg/L at downgradient well MW-02 in 2005.



Other Metals

Other metals above GSLs in historical data included:

- Dissolved antimony was slightly above its GSL at MW-02 during 2005 sampling
- Dissolved iron was above its GSL in at MW-03 during 2005 sampling
- Dissolved manganese was above its GSL in 1991 samples collected from I-70 boreholes TH-1 through TH-5. It was also detected above its GSL in 2005 sampling at MW-02 and MW-03.
- Dissolved mercury was above its GSL at DC-3
- Dissolved selenium was above its GSL at DC-2, DC-3, and DC-4

The above list of other metals detected in historical data above GSLs were detected in upgradient, downgradient, and cross-gradient wells; however, these detections were sporadic in nature and/or concentrations were only slightly above respective GSLs.

5.3.2.2 Recent Data (2010 to 2016)

The dissolved metals results for wells sampled after the 2009 RI are presented in Table 5-9 and summarized below.

Arsenic

Dissolved arsenic was detected at concentrations above its GSL in recent data at wells CTL MW-04, CTL MW-06, MW-02, and MW-05; however, results for CTL MW-04 and MW-05 were estimated concentrations (flagged with a J qualifier).

The highest dissolved arsenic concentrations were present at downgradient well MW-02 during the 2012 sampling at 141 µg/L. The High Street locations which are considered upgradient and cross-gradient (HS-01 through HS-08) showed no arsenic detections in groundwater when sampled in 2010. It is difficult to perform a direct comparison of the results from all the wells as the data were collected during different time periods. However, quarterly data from 2012 which included upgradient, cross-gradient, and downgradient wells indicated that arsenic is only present above the GSL at downgradient well MW-02. The 2014 data show further indication of elevated arsenic at MW-02, but it was also detected above the GSL at upgradient well MW-05. Arsenic remained below the GSL at upgradient well MW-06 in 2014. Sampling of the CTL wells in 2014 showed no elevated arsenic concentrations at CTL MW-01, -02, or -03, which are upgradient, but CTL wells within OU2 (CTL MW-04 and CTL MW-06) contained detections above the GSL. CTL MW-02 is positioned just downgradient of MW-05, which suggests the exceedance that occurred in 2014 at MW-05 may be a false positive.

In general, these results suggest that the water flowing from upgradient wells into the OU2 does not contain elevated arsenic concentrations, so the higher detections observed at MW-02, CTL MW-04, and CTL MW-06 could be from localized sources near the wells or a result of dissolution of arsenic as groundwater migrates through the southeastern boundary of OU2 where arsenic soil concentrations are relatively high (see Figures 8a through 8c). Since there are no centrally located monitoring points between upgradient and downgradient wells, it is unclear if the elevated arsenic detections at wells within the footprint of OU2 are continuous or isolated.



Lead

Dissolved lead concentrations were not detected above the GSL of 50 µg/L in recent results. The highest detected results were still well below the GSL at 20.6 µg/L at upgradient well MW-05 in 2014, and 18.4 µg/L at downgradient well MW-03 in 2012.

Lead concentrations in groundwater are well characterized near site boundaries. However, potential impacts central to the Coliseum parking lot and beneath the Globeville Landing Park are unknown.

Other Metals

Other metals above GSLs in recent data included:

- Dissolved antimony at MW-02 in 2012 (slightly above its GSL at MW-02 in the third and fourth quarters of the 2012 sampling); dissolved antimony in 2014 at MW-01 and MW-05 (estimated)
Dissolved beryllium at MW-01 and MW-05 in 2014 (estimated)
- Dissolved cadmium at SWDI-1 in 2015, MW-05 in 2014 (estimated), HS-03 and HS-04 in 2010, and CTL MW-03 in 2011
- Dissolved copper at MW-05 in 2014 (estimated)
- Dissolved iron at MW-02 and MW-03 in 2012 and 2014, CTL MW-04 in 2014, CTL MW-05 in 2014 and 2015, CTL MW-06 in 2014, and SWDI-6 in 2015
- Dissolved manganese at CTL MW-04 and CTL MW-05 in 2011 and 2014, at CTL MW-06 in 2011, 2014, and 2015, at MW-01, MW-02, and MW-03 in 2012 and 2014, at MW-05 in 2014, at multiple SWDI locations in 2015, and at TH-47 in 2016
- Dissolved nickel at MW-01 in 2014 (estimated)
- Dissolved thallium at MW-01 and MW-05 in 2014 (estimated)
- Dissolved uranium at TH-45, TH-47, and TH-48 in 2016
- Dissolved vanadium at MW-01 in 2014 (estimated)

Although the list of “other metals” above GSLs for recent data appears extensive, these are naturally occurring in groundwater and are being compared to the drinking water and agricultural standards. Additionally, most of the concentrations were estimated (flagged with a J qualifier). Many of the concentrations are likely within the limits of natural variability for metals in groundwater.

5.3.3 Volatile Organic Compounds

5.3.3.1 Historical Data (prior to 2010)

The historical VOC detected results are summarized in Table 5-10. Available historical VOC groundwater data includes samples collected from DC-2, DC-3, and DC-4 in 1997 (Walsh, 1997) and MW-02 and MW-03 in 2005 (Brown and Caldwell, 2005a). No VOCs were detected above GSLs in the 1997 or August 2005 data collected from the DC and



MW locations noted above. Additionally, VOCs were sampled as part of the Brighton Boulevard Investigation at locations along the eastern boundary of the site (BB-BB-26 through BB-BB-34 and BB-CT-38 through BB-CT-40). These data are not tabulated in Table 5-10 because they are considered screening level in nature due to the sample collection methods (see Section 3.1.6). Results for this sampling did show detections of VOCs at some of the locations along Brighton Boulevard; however, concentrations were all below GSLs, with the exception of BB-BB-26. Concentrations of VOCs were detected above the GSLs at this location with TCE and PCE at relatively high concentrations of 700 and 4,800 µg/L, respectively. The TCE result at BB-BB-26 was flagged with a B qualifier, indicating that TCE was also detected in the blank. Results for BB-CT-38 and BB-CT-39 to the north of the site showed elevated concentrations of PCE at 300 µg/L and 92 µg/L, respectively. TCE was also present at a concentration slightly above its GSL at BB-CT-38 at 6 µg/L. Results for the two locations to the southwest of the site, BB-38-22 and BB-38-25, showed detections of bromodichloromethane, TCE, and PCE above GSLs at BB-38-22, and detections of TCE above its GSL at BB-38-25.

5.3.3.2 Recent Data (2010 to 2016)

The recent groundwater VOC data are summarized in Table 5-11. The VOC groundwater results from these investigations were as follows:

- Benzene was detected slightly above the GSL at MW-03 in 2014 and SWDI-1 in 2015 (7.7 and 6 µg/L compared to a GSL of 5 µg/L)
- Chlorobenzene was detected slightly above the GSL in one result with an estimated concentration from MW-03 in 2014
- Chloroform was detected in 17 of the wells, but was above the GSL only at CTL MW-01 in 2011, HS-04 in 2010, MW-06 in 2012 and 2014, and QUAD-3 and QUAD-4 in 2015
- PCE was detected above the GSL at CTL MW-01 in 2014, CTL MW-06 in 2011, HS-01 in 2010, MW-01 in 2010, 2012, and 2014, MW-03 in 2014, SWDI-2, SWDI-4, SWDI-7, SWDI-12, SWDI-14 through SWDI-16 in 2015, and TH-45 through TH-48, and TH-52 in 2016. Concentrations ranged from 0.17 µg/L at MW-06 to 52 µg/L at MW-01.
- Trichloroethene (TCE) was detected above its GSL at CTL MW-01 in 2014, CTL MW-06 in 2011, HS-01 in 2010, MW-01 in 2012 and 2014, MW-03 in 2014, SWDI-2, SWDI-4, SWDI-8, and SWDI-16 in 2015, and TH-48 and TH-52 in 2016. Concentrations ranged from 0.14 µg/L at MW-05 to 19 µg/L at MW-01.
- Vinyl chloride was detected above its GSL once at SWDI-7 in 2015 and the concentration was estimated (flagged with a J qualifier)
- Other VOCs were detected, but concentrations were below their respective GSLs.

Most of the VOC detections were low concentration and isolated to a few detections at select locations. Exceptions to this include chloroform, PCE, and TCE. Chloroform is a common lab contaminant and it was only above the GSL at three locations. The PCE detections above the GSL occur within the southern portion of OU2 and extend offsite to the south at CTL MW-01; however, sampling at nearby wells HS-05 and MW-06 has not shown elevated detections. The highest detections occurred in samples collected from MW-01 which is considered a downgradient well near the western boundary of the OU2; however, wells offsite and upgradient also contained elevated PCE detections. The elevated TCE detections are similar in location and relative magnitude as the PCE detections, with the highest detected



concentrations at MW-01, and offsite upgradient wells also containing elevated detections. Figure 11 shows the most recent set of TCE and PCE groundwater data for the site and displays a combination of sampling results depending on the location as follows:

- April 2011 results at CTL MW-03
- Quarter 1 2014 results at CTL MW-01, CTL MW-02, CTL MW-04, CTL MW-05, MW-01, MW-02, MW-03, MW-05, and MW-06
- Quarter 2 2015 results at QUAD wells
- July 2015 results at CTL MW-06 and the SWDI wells

Since there are no centrally located wells, potential VOC impacts central to the Coliseum parking lot and beneath the Globeville Landing Park are unknown.

5.3.4 Semi-Volatile Organic Compounds

5.3.4.1 Historical Data (prior to 2010)

The historical groundwater SVOC detected results are summarized along with VOCs in Table 5-10. Groundwater samples were collected for analysis of SVOCs in historical data from DC-2, DC-3, and DC-4 in 1997 (Walsh, 1997) and MW-02 and MW-03 in 2005 (Brown and Caldwell, 2005a). No SVOCs were detected above GSLs in 1997 (DC locations) or 2005 (MW-02 and MW-03).

5.3.4.2 Recent Data (2010 to 2016)

The recent groundwater SVOC detected results are summarized along with VOCs in Table 5-11. Samples were collected at wells throughout OU2 including the QUAD, CTL, and MW wells as well as temporary piezometers during the High Street investigation (HS-01 through HS-08). Results showed some sporadic low-level detections with concentrations all below GSLs for the recent sampling events. Data from these wells provides a good distribution throughout OU2 and suggest SVOCs are not likely a concern in groundwater at the site.

5.3.5 Total Petroleum Hydrocarbons

Groundwater sampling for petroleum hydrocarbons occurred in 1997 from locations DC-2, DC-3, DC-4. Results showed low level detections of oil range organics (oil & grease, total recoverable) and diesel range organics (TPH as diesel fuel) at DC-4 at 5.8 mg/L and 2 mg/L, respectively. Additionally, wells MW-02 and MW-03 were sampled for petroleum hydrocarbons in 2005, which showed low level detections of TPH (C10-C36) at MW-02 and MW-03, and a low-level detection of gasoline range organics at MW-03 (0.049 mg/L).

5.3.6 Polychlorinated Biphenyls

Groundwater sampling for PCBs was conducted at wells MW-02 and MW-03 in 2005. These results showed no detections of PCBs in groundwater.



5.4 SURFACE WATER AND SEDIMENTS

Surface water and sediment sampling locations evaluated as part of this nature and extent discussion are depicted on Figure 12. The two sample locations are within the South Platte River and includes analytical results from the 2005 and 2006 Sediment, Surface Water, and Groundwater Investigations (CCoD, 2006a and 2006b). A summary of the comparative analysis of the surface water and sediment data is provided in Table 5-12. Surface water and sediment samples were analyzed for metals only. Location N43 is located upstream of OU2 and appears to be near the eastern bank of the river and N46 is located downstream of the OU2 and appears to be near the western bank of the river. For the purposes of this extent discussion, a comparative analysis was performed between the upstream and downstream data for the surface water and sediment results. A summary of these results is provided below.

- The surface water data collected at the two locations did not indicate significant differences in arsenic and lead concentrations between upstream and downstream of OU2. Dissolved arsenic and lead detected at both locations where as follows:
 - Dissolved arsenic concentrations ranged from 0.65 µg/L to 1.6 µg/L at N43 and 0.73 µg/L to 1.7 µg/L at N46
 - Dissolved lead concentrations ranged from 0.19 µg/L to 0.35 µg/L at N43 and 0.08 µg/L to 4.9 µg/L at N46. The lead detection of 4.9 µg/L was an anomaly, with all other results at 0.33 µg/L or lower.
- Similarly, metal concentrations in the sediment samples did not indicate significant differences in metal concentrations between the upstream and downstream location. Arsenic and lead were detected at both locations, as follows:
 - Arsenic concentrations ranged from 1.0 mg/kg to 1.9 mg/kg at N43 and 1.0 mg/kg to 2.7 mg/kg at N46
 - Lead concentrations ranged from 27 mg/kg to 550 mg/kg at N43 and 20 mg/kg to 68 mg/kg at N46. The lead detection at 550 mg/kg at upstream location N43 was an anomaly, with all other results below 50 mg/kg.

Although these data do not indicate increases in arsenic and lead concentrations downstream of OU2, these data are not comprehensive enough to conclude regarding the nature and extent of COPCs in surface water and sediment within the South Platte River relative to OU2. However, additional sampling data for surface water and sediment is available for review based on regular sampling that the CCoD conducts upstream and downstream of OU2 as part an ongoing evaluation of water quality in the South Platte River.

5.5 LANDFILL GAS AND SOIL GAS

Landfill gas sampling (e.g., methane [CH₄] monitoring) was conducted as part of the 2010 High Street Limited Subsurface Investigation (Brown and Caldwell, 2010) in boreholes HS-01, HS-02, HS-03, HS-04, and HS-08. The monitoring was conducted using a Landtec Gem 500® landfill gas meter. Gas samples were collected by drilling an additional borehole 2 to 3 feet from the existing borehole. The drilling rods were connected to the gas meter with disposable Tygon® tubing and measurements were collected at suspected depths of landfill material. The readings were collected from the bottom of the drill rods and the results are shown in Exhibit 1 below.



Exhibit 1: Landfill Gas Field Sampling Data (Brown and Caldwell, 2010)

Loc ID	Soil Gas (percent of total)				Sample Depth (feet)	
	O ₂	CH ₄	CO ₂	Balance	Top	Bottom
HS-01	0.0	0.5	5.8	93.7	17	20
HS-02	0.0	43.4	16.3	40.5	7	10
HS-03	0.0	56.7	16.1	27.5	12	15
HS-04	17.3	0.0	1.3	81.4	17	20
HS-08	3.6	9.8	8.0	78.7	10	13

Methane concentrations ranged from 0.0 at HS-04 to 56.7 at HS-03 percent of total soil gas. Concentrations of methane were higher at HS-02 and HS-03 which contained soils with diesel range organics (Table 5-5), suggesting that the presence of methane could be a result of the biodegradation of petroleum hydrocarbons, landfill materials or naturally occurring organics via methanogenesis. The presence of methane in the subsurface could degrade water quality in the shallow aquifer. Although methane itself is not a concern in groundwater, the oxidation of methane can result in higher concentrations of dissolved metals in groundwater. Additionally, methane concentrations above five percent (100 percent lower explosive limit [LEL]) present potential explosive hazards during subsurface work/construction efforts. These results provide some indication of the presence of methane in the subsurface at OU2 but are limited in scope and cover only a portion of the site (see Figure 5 for the 2010 High Street sample locations).



6.0 CONCEPTUAL SITE MODEL

6.1 HISTORICAL CONCEPTUAL SITE MODEL

Three risk assessment reports prepared by EPA and Syracuse Research Corporation for OU2 were reviewed to evaluate the conceptual site model, as follows:

- 2006 Draft Baseline Human Health and Screening Level Ecological Risk Assessment for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2 (EPA, 2006)
- 2009 Final Screening-level Ecological Risk Assessment (SLERA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2 (EPA, 2009a)
- 2009 Final Baseline Human Health Risk Assessment (HHRA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2 (EPA, 2009b)

The Final 2009 HHRA and SLERA considered additional soil sample data for lead and arsenic collected after the 2006 Draft risk assessment (EPA, 2006). EPA's risk assessment was confined to COPCs associated with wastes from the historical Omaha & Grant Smelter. Arsenic, cadmium, copper, lead, and zinc were the primary COPCs. High levels of arsenic and lead were detected in some subsurface soil samples.

6.1.1 Summary of the 2009 HHRA

The 2009 HHRA divided OU2 into two large Commercial Exposure Units assuming future commercial development (Figure 3-4 / 2009 HHRA), and four Residential Exposure Units (Figure 3-5 / 2009 HHRA) assuming future development for multifamily residential use. Figures 3-4 and 3-5 from the 2009 HHRA are provided as Appendix D for reference. The Globeville Landing Park was not identified as an Exposure Unit, although recreational contact with surface water and sediment in the South Platte River was evaluated. Soil data for the Globeville Landing Park were excluded from the 2006 HHRA and SLERA because EPA delisted the surface soils in this area from the VB/I-70 OU2 Superfund Site study area based on sampling efforts conducted in 2002 (EPA, 2003).

The 2009 HHRA considered four on-site receptors; commercial workers, construction workers, adult and child residents, and recreational visitors to the South Platte River. Incidental ingestion of COPCs in surface soil and subsurface soil (construction worker) was identified as the only potentially significant pathway of exposure for quantitative analysis. Other potentially complete pathways of exposure were identified but determined to contribute little to cancer risk and non-cancer hazard. Recreational visitors to the South Platte River were quantitatively evaluated for incidental ingestion of surface water and sediment.

Quantitative estimates of cancer risk and non-cancer hazard presented in the 2009 HHRA were calculated using methods consistent with the state of the practice at that time. Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) estimates were presented. The RME estimates are more conservative (higher) than the CTE estimates and typically drive risk management decisions.

Exposure to inorganic lead in soil was evaluated using Physiologically-Based Pharmacokinetic Models to estimate fetal blood lead concentration from maternal exposure (Commercial Worker and Construction Worker) and blood lead



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concentrations of young children ages zero to six years (Future Residential Receptor). The blood lead models estimate the probability that the blood lead concentration of the fetus of an exposed mother, or the blood lead concentration of a young child, will be greater than a target value given a specified concentration of lead in soil. In 2009, the target blood lead concentration for protection of young children was 10 micrograms of lead per deciliter of blood (10 µg/dL). In 2009 a less than 5 percent probability of exceeding 10 µg/dL (from exposure to lead in soil) was considered acceptable. In the intervening years, the target blood lead concentration has been reduced. The target blood lead concentration recommended by the Centers for Disease Control and Prevention (CDC) is currently 5 µg/dL (CDC 2012).

The 2009 HHRA reached the following conclusions for each of the four receptors.

Commercial Workers in Commercial EUs:

- The RME cancer risk and non-cancer hazard were: 2E-06 and 2E-02 for Commercial Exposure Unit 1, respectively; and 1E-05 and 3E-01 for Commercial Exposure Unit 2, respectively.
 - Cancer risk and non-cancer hazard from ingestion of COPCs in surface soil were below levels of regulatory concern.
- The probability of exceeding the target fetal blood lead concentration of 10 µg/dL for a pregnant Commercial Worker was less than 0.1% for Commercial Exposure Unit 1; but 70% for Commercial Exposure Unit 2.
 - The 2009 HHRA indicated that exposure to lead in surface soil in Commercial Exposure Unit 2 is of potential concern for the fetus of a pregnant Commercial Worker.

Construction Workers in Residential and Commercial EUs:

- The RME cancer risk and non-cancer hazard for Construction Workers were estimated at:

Exposure Unit	Cancer Risk	Non-Cancer Hazard
Residential EU 1	4E-06	2E-01
Residential EU 2	5E-06	6E-01
Residential EU 3	5E-07	3E-02
Residential EU 4	1E-06	7E-02
Commercial EU 1	6E-07	5E-02
Commercial EU 2	4E-06	5E-01

- Cancer risk and non-cancer hazard from ingestion of COPCs in surface and subsurface soil were below levels of regulatory concern.
- The probability of exceeding the fetal blood lead concentration of 10 µg/dL for a pregnant Construction Worker was less than 0.1% for Residential Exposure Units 1, 3, and 4, and Commercial Exposure Unit 1; but greater than 95% for Residential Exposure Unit 2, and 18% for Commercial Exposure Unit 2.
 - The 2009 HHRA indicated that exposure to lead in surface and subsurface soil in Residential Exposure Unit 2 and Commercial Exposure Unit 2 is of potential concern for the fetus of a pregnant Construction



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Worker. Note that Residential Exposure Units 1 and 2 are within the boundaries of Commercial Exposure Unit 2 and coincide with the location of the former smelter buildings (Figures 3-4 and 3-5).

Hypothetical Future Residents in Residential EUs:

- The RME cancer risk and non-cancer hazard for Hypothetical Future Residents were estimated at:

Exposure Unit	Cancer Risk	Non-Cancer Hazard
Residential EU 1	6E-05	4E-01
Residential EU 2	1E-04	3E+00
Residential EU 3	1E-05	1E-01
Residential EU 4	3E-05	2E-01

- The 2009 HHRA stated that RME (and CTE) cancer risks were within EPA's risk management range for cancer (1E-06 to 1E-04) for all Residential Exposure Units; but the RME non-cancer hazard exceeds a level of concern in Residential Exposure Unit 2 due to concentrations of arsenic, manganese, and thallium in surface soil.
- The probability that a young child resident would have a blood lead concentration exceeding 10 µg/dL was 6.9% for Residential Exposure Unit 1; greater than 95% for Residential Exposure Unit 2; 5.9% for Residential Exposure Unit 3; and 1.5% for Residential Exposure Unit 4.
 - The 2009 HHRA indicates that the concentrations of lead are a potential concern for a hypothetical future young child resident.

Recreational Visitors to the South Platte River Exposure Unit:

- The RME cancer risks and non-cancer hazards were less than 1E-07 and less than or equal to 1E-03 for incidental ingestion of surface water and sediments during recreation activities in the South Platte River Exposure Unit.
 - Cancer risk and non-cancer hazard from incidental ingestion of COPCs in surface water and sediment were well below regulatory levels of concern.
- The probability of exceeding the fetal blood lead concentration of 10 µg/dL for a pregnant Recreational Visitor to the South Platte River was less than 0.1%.
 - The 2009 HHRA indicated that exposure to lead in sediment and surface water in the South Platte River was not a potential concern for the fetus of a pregnant Recreational Visitor.

6.1.2 Summary of the 2009 SLERA

The 2009 SLERA identified three groups of ecological receptors potentially affected by COPCs in soil and groundwater on OU2; Urban Wildlife, Terrestrial Plants, and Aquatic Receptors (fish and benthic organisms) in the South Platte River. The conclusions of the SLERA are briefly summarized below.



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- Although common Urban Wildlife species (e.g. squirrels, rodents, sparrows) may occasionally be present on OU2, there is little if any habitat or resources that would support these receptors.
 - Future development of OU2 for Commercial and/or Multifamily Residential use would be unlikely to create significant habitat for Urban Wildlife.
 - Consequently, potential exposures to Urban Wildlife were not evaluated.
- Since future development could include landscaping and trees, surface, and subsurface concentrations of COPCs were compared to toxicity benchmarks for plants.
 - The 2009 SLERA concluded that the concentrations of metals in some locations were within the phytotoxic range.
- The 2009 SLERA identified groundwater from OU2 migrating to surface water and sediment in the South Platte River as a potential pathway of exposure to Aquatic Receptors (fish and benthic organisms). Concentrations of COPCs in surface water and sediment samples from the South Platte River were compared to toxicity benchmarks.
 - The 2009 SLERA concluded that any impacts from groundwater discharging from OU2 to the South Platte River were not of ecological concern.

6.1.3 Uncertainties Associated with the 2009 HHRA and SLERA

Although the 2009 HHRA and SLERA were consistent with the state of risk assessment practice and understanding at the time, over the intervening years new developments in the evaluation of exposures to lead in soil and concerns about the vapor intrusion pathway have occurred and are sources of uncertainty that could not have been anticipated in the previous risk assessments. The objective of the revised Conceptual Site Model (CSM) described below and subsequent risk assessments based on existing and new environmental sampling data is to establish a basis for informing management decisions for OU2 that are consistent with the current state of the practice and likely plans for future land development.

6.2 REVISED CONCEPTUAL SITE MODELS AND RISK ASSESSMENT APPROACH

The Additional Work Notification letter (August 8, 2017) from EPA Region 8 to the CCoD requested a revised CSM and risk assessment approach. Stantec reviewed the CSMs prepared for the 2009 HHRA and SLERA and discussed possible future development strategies for OU2 with the CCoD. There are multiple parcels (June 2018) within the boundaries of OU2 as previously defined by EPA Region 8's Superfund Program; but not all parcels are owned and controlled by CCoD. Consistent with EPA's request, preliminary revised CSMs were developed for OU2 based on current information about likely future development. The rationale for defining the boundaries of Exposure Units within OU2 and associated receptors to be evaluated in the HHRA and SLERA are briefly discussed in the following sections.

The revised CSMs provide a framework for identifying potential human and ecological receptors, sources, and transport of COPCs in environmental media, and potential pathways and routes of exposure through which receptors may contact COPCs. Risk assessment is an evolving science, and many new developments have occurred since the HHRA and SLERA were submitted in 2009. Additional environmental information is available from investigations that occurred after 2010. CCoD and private-sector redevelopment plans for the properties encompassed by OU2 have changed since



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2009 and continue to change. Many of the models and assumptions used to quantitatively evaluate exposure and associated cancer risk and non-cancer hazard have been updated. For example, the potential for vapor intrusion from VOCs in the subsurface to indoor air has come to the forefront of risk assessment and public health concerns. The public health community has lowered the level of concern for lead in the blood of children and the developing conceptus of a pregnant woman exposed to environmental lead. The revised HHRA for OU2 will consider new information and the current state of risk assessment practice.

6.2.1 CSMs for the Revised HHRA

The boundaries of OU2 were established based on the original property boundary of the Omaha and Grant Smelter and contain areas that could be considered for future development. From a practical standpoint, the potentially developable land is bounded by Brighton Boulevard, the South Platte River, the Pepsi Bottling Group property, the rail lines on the northwest side of the Denver Coliseum parking lots, and 44th Street to the east of the Coliseum buildings. There is a minimum of four distinctly different Exposure Units within these boundaries defined by current and possible future land use:

- Exposure Unit 1 - The Globeville Landing Park
- Exposure Unit 2 - The Denver Coliseum Buildings and parking lot
- Exposure Unit 3 - The Pepsi Bottling Group Property
- Exposure Unit 4 - The Brighton Boulevard area

The four exposure units are shown on Figure 13 and the preliminary CSMs for the revised HHRA are represented graphically in Figures 14 to 17. Feedback

An Exposure Unit is a generally defined as a geographical area within which a receptor has an equal chance of contacting contaminated media at all locations. The HHRA CSM for each Exposure Unit identifies receptors (classes of people) that may be present within the Exposure Unit. Receptors that are currently or may be present on one or more of the four Exposure Units, and have frequent and/or intense contact with environmental media are:

- Recreational users (Globeville Landing Park)
- Residents of multi-family housing (future development)
- Indoor Workers (people who work in shops, restaurants, and offices)
- Outdoor Workers (people who work primarily outdoors performing maintenance or landscaping)
- Construction/excavation workers who are involved in activities such as digging building foundations, installing underground utilities, and contouring the land surface
- Indoor/Outdoor Workers (people who work in the horse barn adjacent to the Coliseum)

Other individuals may visit the Exposure Units to shop, dine in restaurants, and attend events at the Coliseum. However, these receptors are not expected to be present frequently or to have extensive contact with environmental media on OU2. Risks and hazards to these groups of receptors are represented by the categories of individuals listed above.



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The CSM for each Exposure Unit also identified the pathways of exposure by which COPCs may move from a source through environmental media (i.e. soil, groundwater, surface water, sediment, ambient and indoor air) to locations where receptors are located and may have contact with media containing COPCs through ingestion, inhalation, and/or dermal absorption (routes of exposure).

Based on current and historical information, pathways and routes of exposure are designated as Potentially Complete; Potentially Complete but Insignificant (unlikely to contribute to estimated cancer risk and non-cancer hazard); and Incomplete. Potentially complete pathways and routes of exposure will be evaluated quantitatively using historical data, and any new investigation data generated for the Exposure Unit. Potentially complete but insignificant pathways and routes of exposure will be evaluated qualitatively and may be evaluated quantitatively if sufficient sampling data are available. Incomplete pathways will be discussed but not evaluated.

The pathways and routes of exposure identified in the CSMs for OU2 are outlined below and more fully described in the discussion of each of the four proposed Exposure Units. The potential for exposure to COPCs in environmental media is dependent on individual receptor activities, the geographic locations where those activities occur, and the presence of COPCs in environmental media in those locations. Pathways and routes of exposure considered in the CSMs are specific to the current and/or potential future land use for each Exposure Unit and the types of receptors expected to be present.

Soil Pathway:

Contact with soil is a function of receptor daily activities. Receptors may be exposed to COPCs in soil through incidental ingestion (i.e. hand to mouth transfer), skin contact and absorption into the bloodstream through the dermis, and inhalation of COPCs volatilizing from soil or COPCs adsorbed to soil particulate released to ambient air by wind or mechanical disturbance. Except as noted for the Globeville Landing Park, direct contact with COPCs in soil is expected to be a complete pathway of exposure for receptors on OU2.

The distribution of COPCs in soil can vary by depth below ground surface depending on the historical activity from which the COPCs originated. Depending on the questions to be answered by the HHRA, risk assessors frequently evaluate potential contact with COPCs in shallow soil (0 to 2 ft. bgs) and potential contact with COPCs in subsurface soils (0 to 10 ft. bgs or deeper). Receptors may contact surface soil while walking across uncovered ground (i.e. not covered by pavement or other physical barriers), during recreational activities, landscape maintenance, gardening, etc. Except for construction and utility workers, all other receptors are assumed to have contact with COPCs in shallow soils (0 to 2 ft. bgs).

Contact with subsurface soil is associated with intrusive activities such as construction of building foundations, installation and repair of underground utilities, removal of subsurface structures (i.e. underground storage tanks or vaults). For this HHRA only construction workers and excavation workers are assumed to have direct contact with COPCs in subsurface soils from the ground surface to the depth of a standard excavation (0 to 10 ft. bgs). Specific site development plans may warrant evaluation of potential exposures to COPCs in soils deeper than 10 ft. No other receptors identified in the revised CSMs for OU2 engage in activities where they would contact soil deeper than 0 to 2 ft. bgs.



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It Stantec's understanding that the Soil Management Plan for OU2 requires that disturbed or excavated soils be removed from the property and not used as grading material, limiting potential contact with COPCs in subsurface soils to the duration of a specific project.

Sediment in the South Platte River:

Recreational users of the Globeville Landing Park and the stretch of the South Platte River adjacent to OU2 may have limited, incidental exposure to site-related COPCs in bank and submerged sediment-if such COPCs are present in sediment at locations accessed by receptors. Although potentially complete, contact with COPCs in sediments in the South Platte River (if present) is expected to contribute little to cancer risk and non-cancer hazard for recreational receptors.

Surface Water Pathway:

Recreational users of Globeville Landing Park may have incidental contact with COPCs in near-shore surface water in the South Platte River that originated from groundwater beneath OU2 venting to the River. Although potentially complete, contact with COPCs in surface water of the South Platte River (if present) is expected to contribute little to cancer risk and non-cancer hazard for recreational receptors.

Groundwater Pathway:

Groundwater beneath OU2 is not a current or future source of potable water for current and/or future receptors. However, if volatile COPCs are present in groundwater beneath existing buildings, or the intended locations of future buildings, the potential for migration of volatile COPCs from the subsurface to indoor air inside occupied buildings (vapor intrusion) must be considered as a pathway of exposure.

Other potential pathways of exposure to COPCs in groundwater involve incidental ingestion and dermal contact during recreational activities where groundwater from beneath OU2 vents to surface water in the South Platte River; and incidental contact during construction or excavation work where groundwater pools in the bottom of a building foundation or utility trench. Although these pathways may be potentially complete for specific receptors, direct contact with COPCs in groundwater (if present) is expected to contribute little to cancer risk and non-cancer hazard.

Pathways of Exposure to Biological Media:

There are two potential pathways of exposure to COPCs in biological media; consumption of fish from the South Platte River and consumption of produce from urban garden plots. Although these pathways are potentially complete, they are not expected to contribute significantly to cancer risk or non-cancer hazard for the receptors identified in the revised CSMs for OU2. The reasons for this determination are briefly discussed below.

Recreational users of the South Platte River at the Globeville Landing Park or along the shore adjacent to OU2 may catch and consume fish that have accumulated site-related COPCs. People are known to fish in the South Platte River, and it is possible that anglers occasionally consume their catch. Although ingestion of fish from the South Platte River adjacent to OU2 may be a complete pathway of exposure for recreators, it is unlikely to be a significant source of exposure to site-related COPCs. The primary COPCs from historical metal smelting on OU2, arsenic and lead, may be taken up by fish tissues but do not bioconcentrate in the same way as persistent organic compounds such as PCBs. Furthermore, it is very unlikely that recreationally caught fish from the South Platte River are frequently consumed.



Future development of portions of OU2 could include space for urban garden plots on unimproved surface soil, with the possibility that urban garden produce could uptake COPCs from soil and become a pathway of exposure to consumers of the produce. However, it is unlikely that a receptor would consume produce from urban gardens frequently enough to contribute to cancer risk and non-cancer hazard. This pathway will be evaluated qualitatively for future residents on Exposure Units 2 and 4.

Proposed Exposure Units for the revised HHRA are briefly described in the following sections. Receptors and potential pathways of exposure are described for each Exposure Unit.

6.2.1.1 Exposure Unit 1: Globeville Landing Park

The Globeville Landing Park (Exposure Unit 1) consists of all or portions of the following parcels owned by the CCoD: #45; #46; #159; #190; #123; and #229. The physical boundaries of Exposure Unit 1 are shown on Figure 13.

The Globeville Landing Park is integral to the CCoD's overall plan to incorporate public greenspace into infrastructure improvement projects. When development is complete, the Globeville Landing Park will provide enhanced recreational opportunities and access to the South Platte River. Adults and children are expected to use the greenspace areas of the park for a variety of activities, such as walking, cycling, picnicking, and playing in open areas; and the South Platte River for wading and/or swimming, kayaking/canoeing, and fishing. Intermittently

While engaging in these activities, recreational visitors are expected to have direct contact surface soils; however, contact with surface soil is not a complete pathway of exposure to COPCs. Surface soils were delisted by the EPA and soils in place are assumed to be clean (i.e., clean fill placed during recent construction). Recreational visitors may have occasional contact with sediments and surface water in the South Platte River by incidental ingestion and dermal contact. Although these may be complete pathways of exposure to COPCs, they are unlikely to contribute significantly to cancer risk and non-cancer hazards because the frequency (number of visits per unit time) of contact is expected to be limited. Recreational visitors to the Globeville Landing Park are not expected to have direct contact with subsurface soils or groundwater.

As discussed previously, consumption of recreationally-caught fish is identified as a potentially complete but insignificant pathway of exposure. Sampling fish tissue from the South Platte River adjacent to OU2 is not warranted based on current information. Consumption of fish will be qualitatively evaluated in the HHRA.

The Globeville Landing Park is expected to continue as public recreational greenspace into the future, and there are few uncertainties about receptors and pathways of exposure.

Figure 14 is a graphical depiction of the CSM for Exposure Unit 1 for the revised HHRA.

6.2.1.2 Exposure Unit 2: The Denver Coliseum and Parking Lot

The Denver Coliseum buildings and Coliseum parking lot (Exposure Unit 2) consist of parcel #123 owned by the CCoD. The physical boundaries of Exposure Unit 2 are shown on Figure 13.

Future use of the land now occupied by the Denver Coliseum buildings and parking lot is not known but it is likely to be consistent with the current trend of mixed commercial/high density residential developments. Although there are no



(known) specific plans, a mixed commercial/high density residential development could include features such as landscaped greenspaces, recreational areas, and urban garden plots. Re-use of the existing Denver Coliseum or the construction of new performance venues (e.g., rodeo and equestrian events and/or exhibits) is also a possible future use. Since future land use is not known, all plausible receptors and pathways of exposure are being considered in the CSM for Exposure Unit 2.

If some portion of the land within Exposure Unit 2 is developed for mixed commercial/high density residential use (most likely use), future receptors would be; adult and child residents; people who work indoors in restaurants, shops and businesses (indoor workers); people who work outdoors performing maintenance or landscaping; and construction/excavation workers. If the Coliseum Building and adjacent horse barn continue as they are currently, receptors associated with this portion of Exposure Unit 2 include individuals who spend most of their workday in and around the horse barn and Coliseum building (indoor/outdoor workers). Other groups of receptors who are assumed to be present less frequently and have limited opportunity for contact with environmental media include performers and participants in rodeo and/or equestrian events, visitors to events in the Coliseum, and visitors to shops and restaurants.

All current and possible future receptors on Exposure Unit 2 are assumed to have complete pathways of exposure to COPCs in soil through incidental ingestion and dermal contact. Construction workers and excavation workers are assumed to have direct contact with COPCs in soils from the surface to the depth of an excavation (0 to 10 ft. bgs). All other receptors are assumed to have direct contact with COPCs in surface soil (0 to 2 ft. bgs). Receptors who work indoors and future residents are assumed to have potential inhalation exposure to vapors migrating from groundwater to the air inside future or existing buildings (if volatile COPCs are present in the subsurface at those locations).

Other potential pathways of exposure that may also contribute to cancer risk and non-cancer hazard are: inhalation of COPCs released to ambient air from wind and mechanical disturbance of surface soil by construction/excavation workers; and consumption of produce from urban garden plots.

Shallow groundwater beneath Exposure Unit 2 is not a source of potable water. However, the depth to groundwater is approximately 10 feet bgs in some locations in OU2. If sub-grade construction is required for future buildings, it is likely that groundwater may be encountered during excavations and would need to be pumped out and managed. In this case, a construction/excavation worker may have incidental contact with shallow groundwater through dermal contact and inhalation of VOCs (if these COPCs are present in groundwater at the project location).

Figure 15 is a graphical depiction of the CSM for Exposure Unit 2 for the revised HHRA.

6.2.1.3 Exposure Unit 3: The Pepsi Bottling Group Property

The Pepsi Bottling Group property (Exposure Unit 3) is an active commercial/industrial facility and consists of all or portions of the following parcels owned by Pepsi: #009, #052, #226. The physical boundaries of Exposure Unit 3 are shown on Figure 13.

In the absence of information to the contrary, it is assumed that the Pepsi Bottling Group property will continue in its current capacity or some other commercial/industrial use. If this property is redeveloped for some other purpose, such as mixed high-density residential/commercial, an updated evaluation of potential receptors and pathways of exposure would be appropriate. Assuming the current land use continues there are few uncertainties associated with receptors and potential pathways of exposure.



Receptors on the Pepsi Bottling Group property are adult indoor workers and outdoor maintenance workers at the facility and excavation workers engaged in short-term projects such as repair or installation of underground utilities. Employees at the Pepsi Bottling Group property may be exposed to COPCs in shallow soils (0 to 2 ft. bgs) and vapors migrating from soil or groundwater to indoor air (if volatile COPCs are present in the subsurface). Construction workers and excavation workers may be exposed to COPCs in subsurface soils (0 to 10 ft. bgs or possibly deeper). Construction workers and excavation workers may have incidental contact with groundwater in the bottom of the trench and inhalation of COPCs released from groundwater to the air in the trench (if these COPCs are present in groundwater at the project location).

Figure 16 is a graphical depiction of the CSM for Exposure Unit 3 for the revised HHRA.

6.2.1.4 Exposure Unit 4: Brighton Boulevard

The Brighton Boulevard Exposure Unit (Exposure Unit 4) is comprised of multiple parcels owned by different entities: #046, #049, #182, #218, #227, and #228. The physical boundaries of Exposure Unit 4 are shown on Figure 13.

Current CCoD development plans are to enhance the Brighton Boulevard Street-scape, including the portion of Brighton Boulevard within the boundaries of OU2. Current land use along Brighton Boulevard adjacent to the Denver Coliseum is primarily commercial (other than the Pepsi Bottling Group). Mixed high-density residential/commercial and possibly public green space would be consistent with current trends. Enhancement of the Brighton Boulevard street-scape could include renovation/re-purposing of existing shops and restaurants, construction of new multi-family housing, open landscaped and public greenspace along McFarland Drive adjacent to the Coliseum parking lot, and community garden plots. Development of the Brighton Boulevard area could also be integrated into a larger plan involving the Denver Coliseum and parking lot (i.e., Exposure Unit 2).

Possible receptors for the Brighton Boulevard Exposure Unit 4 are; residents of high-density multi-family housing, people who work in shops, offices, and restaurants (indoor workers), outdoor maintenance workers and landscapers (outdoor workers), and construction/excavation workers.

All current and possible future receptors on Exposure Unit 2 are assumed to have complete pathways of exposure to COPCs in soil through incidental ingestion and dermal contact. Construction workers and excavation workers are assumed to have direct contact with COPCs in soils from the surface to the depth of an excavation (0 to 10 ft. bgs). All other receptors are assumed to have direct contact with COPCs in surface soil (0 to 2 ft. bgs). Receptors who work indoors and future residents are assumed to have potential inhalation exposure to vapors migrating from groundwater to the air inside future or existing buildings (if volatile COPCs are present in the subsurface at those locations).

Other potential pathways of exposure that may also contribute to cancer risk and non-cancer hazard are inhalation of COPCs released to ambient air from wind and mechanical disturbance of surface soil by construction/excavation workers.



SUMMARY REPORT - 6.0 CONCEPTUAL SITE MODEL

Shallow groundwater beneath Exposure Unit 2 is not a source of potable water. However, the depth to groundwater is approximately 10 feet bgs in some locations in OU2. If sub-grade construction is required for future buildings, it is likely that groundwater may be encountered during excavations and would need to be pumped out and managed. In this case, a construction/excavation worker may have incidental contact with shallow groundwater through dermal contact and inhalation of VOCs (if these COPCs are present in groundwater at the project location).

Figure 17 is a graphical depiction of the CSM for Exposure Unit 4 for the revised HHRA.

6.2.2 CSM for the Revised SLERA

Except for the greenspace in Globeville Landing Park and the South Platte River corridor, there is little, if any useable habitat and resources to support ecological receptors, including common Urban Wildlife species. Mixed commercial and high-density residential development of the land area currently occupied by the Denver Coliseum building and parking lot, and the Brighton Boulevard Exposure Unit is anticipated to include landscaping and greenspace but is not expected to create wildlife habitat.

The 2009 SLERA indicated that concentrations of metals in some soil in some locations were in the phytotoxic range. While this is hypothetically a complete exposure pathway for vegetation, this is unlikely to be a concern for landscape plantings integrated into future development. Ingestion of COPCs in surface soils or prey items such as earthworms and arthropods may be a complete pathway of exposure for some common urban wildlife such as birds and rodents, it is not likely to be a significant concern due to the general absence of habitat on OU2 except for the Globeville Landing Park.

The 2009 SLERA identified groundwater from OU2 migrating into surface water and sediment of the South Platte River as a potential pathway of exposure to fish and benthic organisms. However, the 2009 SLERA concluded that groundwater discharges to the River were not an ecological concern. The CSM for the revised SLERA also identifies fish and benthic organisms as receptors but adds urban wildlife species that forage along the river bank and in the shallow water (i.e., raccoons, opossum, wading shorebirds, and other waterfowl such as ducks) that may be exposed to COPCs associated with OU2 through contact with sediments and consumption of prey items.

The updated SLERA will compare historical data and any new investigation data generated for OU2 to current ecological screening values for sediment and soil (bank soils along the South Platte River) and for surface soil in other locations on OU2.

There are uncertainties associated with potential exposures to ecological receptors that will be evaluated qualitatively in the revised SLERA.

Figure 18 is a graphical depiction of the CSM for the revised SLERA.



7.0 POTENTIAL DATA GAPS

This section summarizes the potential data gaps for the RI within OU2. This summary will be used as a basis for developing a scope of work for a revised RI for OU2.

7.1.1 Environmental Media and Sample Locations

As summarized in Section 3.0 of this letter report, several environmental investigations were conducted in, and around the boundaries of OU2 for different purposes after the completion of the 2009 RI. Environmental data from both recent and historical investigations are expected to be usable for the revised RI, HHRA, and SLERA. However, there are some data gaps to be addressed for the revised RI, HHRA, and SLERA to adequately support a Record of Decision (ROD) and to inform decisions for redevelopment of OU2. Additional data needs are summarized below.

7.1.1.1 Landfill Waste Material

The results of the subsurface soil sampling in the pre-RI, 2009 RI and post-RI investigations indicated that landfill material is thicker in places and is more laterally extensive than what was shown in the 2009 RI Report, as presented in Section 5.1 and shown on Figure 6. Therefore, a limited number of additional boreholes are recommended to confirm the thickness of the landfill material within OU2 in the central portion of the Coliseum parking lot, the Coliseum Barn area, and along the southeast side of Arkins Court / McFarland Drive. This can be incorporated into the scope of the recommended well installations discussed below to minimize the number of additional boreholes advanced.

7.1.1.2 Soil

Most of the existing environmental data are for surface and subsurface soil, with a high density of sample locations in the Globeville Landing Park and the area between Brighton Boulevard and the Pepsi Bottling Group. However, recent construction has removed most surface soils from the Globeville Landing Park, and clean fill placed over the area. EPA issued a letter to the CCoD "delisting" surface soil at the Globeville Landing Park (EPA, 2003). Although direct contact with surface soil is a potentially complete pathway of exposure for recreational receptors at the Globeville Landing Park, COPCs are not expected to be present in the soil cover placed during the recent park construction. Recreational receptors are not expected to have direct contact with deeper soils below the clean fill. Additional soil samples are not proposed for the Globeville Landing Park. In addition, it is assumed soils within the Pepsi property were removed as planned during the historical work conducted as referenced in Section 3.1.3 of this report. The combination of the removal information and previous data collected in the Pepsi property is considered sufficient.

Soil conditions beneath the pavement of the Coliseum parking lot are relatively well characterized, except for some data sparsity at the center and southwest portions of the parking lot. As a result, collection of a few soil samples within these areas is recommended. These soils should be analyzed for the following:

- Metals with a focus on arsenic and lead based on historical smelter operations
- VOCs and TPH based on the mixed industrial use of the property and operation of a municipal landfill.

To the extent possible, these additional soils samples should be collected in conjunction with the recommended well installations and soil vapor sampling recommended below.



7.1.1.3 Sediments in the South Platte River

Bank soil and submerged sediment along the South Platte River in the Globeville Landing Park has not been well characterized for COPCs associated with historical smelting operations or COPCs potentially associated with the former municipal waste landfill. Planned construction at the Globeville Landing Park will replace concrete-lined storm water channels with open, natural channels in a new alignment before reaching the South Platte River. This project will remove some of the existing bank sediment and reinforce a portion of the bank with rip-rap and stone. Following construction, confirmatory sediment samples are recommended for metals and VOCs to characterize post-construction sediment upstream, adjacent to, and downstream of the Globeville Landing Park. The findings from these samples will be used to evaluate both human exposure from direct contact during recreational activities, and potential exposures to aquatic and terrestrial receptors.

7.1.1.4 Surface Water in the South Platte River

Existing surface water sample data are limited to metals analysis in the South Platte River upstream and downstream of OU2. Although surface water is a complete pathway of exposure for recreational receptors (wading, kayaking) and aquatic/terrestrial ecological receptors, it is not expected to be a significant contributor to human or ecological exposures to COPCs associated with OU2. A summary of data for an upstream and downstream location are provided in Section 5.4 of this report; however, additional sampling data for surface water is available for review based on regular sampling that the CCoD conducts upstream and downstream of OU2 as part of an ongoing evaluation of water quality in the South Platte River. Surface water data from the regularly conducted sampling for water quality will be reviewed as part of the RI. In addition, surface water sampling is recommended to occur in conjunction with the sediment sampling efforts after the completion of construction activities associated with the Globeville Landing Park.

7.1.1.5 Groundwater

Groundwater has been analyzed for metals, VOCs, SVOCs, TPH, and PCBs at varied locations and frequencies. The groundwater COPCs based on previous sampling and historical site use are metals, VOCs, and TPH. Groundwater conditions upgradient and downgradient of the Coliseum buildings and parking lot have not been well-characterized. The potential for groundwater impacted with COPCs due to migration onto OU2 from properties outside OU2 has not been fully evaluated.

Additional sampling for metals, VOCs, and TPH is recommended to characterize groundwater migrating into the South Platte River, and to evaluate whether groundwater may be a source of VOCs that could migrate to indoor air in existing or future buildings. The additional groundwater data will be used to evaluate the lateral and vertical extent of COPCs in groundwater within and around OU2; the vapor intrusion pathway for the occupants of future commercial and residential buildings; and direct contact pathways of exposure to construction/excavation workers. Should soil sampling indicate the presence of other constituents at concentrations above screening levels, groundwater sampling should be analyzed for these as well.

There is uncertainty regarding ground surface elevations in certain areas of OU2 and there is a lack of groundwater monitoring points. Groundwater between upgradient and downgradient (historical) wells has not been well characterized historically due to a lack of centrally located monitoring points. Additionally, the recent abandonment of wells and piezometers has left the current monitoring network to one downgradient monitoring well (MW-02) and five



SUMMARY REPORT - 7.0 POTENTIAL DATA GAPS

closely spaced wells and piezometers in the southern portion of the Coliseum parking lot. To adequately assess potential groundwater impacts and groundwater pathways at OU2, it is recommended that additional monitoring wells be installed to the south/southeast corner of the OU2 boundary to represent the upgradient conditions, around the Coliseum parking lot, and near the Globeville Landing Park. Additionally, to resolve the potential impact from upgradient sources, additional upgradient wells may be warranted on the north side of Brighton Boulevard. Groundwater sample collection and measurement of water levels in the existing wells and recommended new wells will allow for better interpretation of groundwater flow directions and characterization of potential groundwater impacts.

7.1.1.6 Soil Gas

Soil gas sampling for landfill gas (e.g., methane) and VOCs is recommended to characterize the potential for vapor intrusion in locations where commercial/residential buildings may be constructed on OU2. Soil gas samples were previously analyzed for methane from open boreholes; however, sample locations were limited and there are no soil gas data for other VOCs that may be related to the former municipal waste landfill. It is recommended that soil gas sampling should focus on areas where vapor intrusion could be an existing (e.g., Coliseum or Coliseum Barn) or potential future threat (e.g., areas where future development is anticipated). This sampling can be conducted in conjunction with the other recommended efforts.



8.0 REFERENCES CITED

- Airtech Environmental Services, 2017a. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. February 13.
- Airtech Environmental Services, 2017b. Report on the Globeville Landing Outfall (GLO) PM₁₀ and Metal Ambient Air Study. February 28.
- Airtech Environmental Services, 2017c. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. March 22.
- Airtech Environmental Services, 2017d. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. April 21.
- Airtech Environmental Services, 2017e. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. May 26.
- Airtech Environmental Services, 2017f. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. July 14.
- Airtech Environmental Services, 2017g. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. August 21.
- Airtech Environmental Services, 2017h. Report of the Globeville Landing Outfall (GLO) PM₁₀ and Metals Ambient Air Study. September 25.
- Aguirre Engineers Inc., 1995 (Revised), Subsurface Investigation and Engineering Analysis Report I-70 from Washington Street to Brighton Boulevard City and County of Denver, Colorado CDOT Project No. IM-IR(CX) 070-4(145), Prepared for Carter & Burgess, Inc., May 9.
- Brown and Caldwell, 2005a. Draft Letter Report on Groundwater Samples. September 22.
- Brown and Caldwell, 2005b. Final Quarterly Groundwater Monitoring Report, November/Fourth Quarter 2005, City and County of Denver, Vasquez Boulevard and Interstate 70, Operable Unit 2. December 16.
- Brown and Caldwell, 2006a. Quarterly Groundwater Monitoring Report, Vasquez Boulevard and Interstate 70, Operable Unit 2, Denver, Colorado. March 14.
- Brown and Caldwell, 2006a. Quarterly Groundwater Monitoring Report, Vasquez Boulevard and Interstate 70, Operable Unit 2, Denver, Colorado. May 22.
- Brown and Caldwell, 2010. High Street Limited Subsurface Investigation. May 28
- Buckingham, Austin, 1992. Preliminary Assessment Omaha & Grant Smelter Site, Denver, Colorado. February 27.



SUMMARY REPORT - 8.0 REFERENCES CITED

- CDPHE, 2014. Arsenic Concentrations in Soil, Risk Management Guidance for Evaluating. July.
- CDPHE, 2016. Regulation No. 41 – The Basic Standards for Ground Water. 5 CCR 1002-41. December
- City and County of Denver (CCoD), 2006a. VB/I-70 OU-II Sample Results for Groundwater, Sediment and Surface Water collected on 24 January 2006, Letter report. February 27.
- CCoD, 2006b. VB/I-70 OU-II Sample Results for Groundwater, Sediment and Surface Water collected on 12 April 2006, Letter report. April 28.
- CH2MHill, 2002. Globeville Landing Park Soil Sampling Plan & Results, Project Number 161799, prepared for CCoD Department of Environmental Health, Environmental Services Division. October.
- CH2MHill, 2003. A Guide to Performing Subsurface Work in the Vicinity of the Denver Coliseum and Globeville Landing Park. May.
- CH2MHill, 2004. Denver Coliseum Barn Soil Excavations and Stockpile Summary Report, Air Monitoring Results, Soil Sampling Results, and Removal Summary. Prepared for CCoD Department of Environmental Health, Environmental Services Division. February.
- CTL Thompson, 2011. Limited Phase II Environmental Site Assessment, 40th Street Outfall, South Platte River to Blake Street, Denver, Colorado. May 10.
- CTL Thompson, 2013a. Supplemental Geotechnical Investigation, 40th Street Outfall, Northwest of 40th and Blake Streets to Globeville Landing Park, Rev 1, Denver, Colorado. February 21.
- CTL Thompson, 2013b. Limited Phase II Environmental Site Assessment, 40th Street Outfall, Denver, Colorado. June 13.
- CTL Thompson, 2016a. Supplemental Geotechnical Investigation, 40th Street Outfall, Northwest of 40th and Blake Streets to Globeville Landing Park, Denver, Colorado. February 25.
- CTL Thompson, 2016b. Lead and Arsenic Soil Sample Results, Globeville Landing Park Outfall, Phase 1B, Northeast of 38th Street and Arkins Court, Denver, Colorado. October 19.
- EMSI, 2009. Remedial Investigation Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2 – On-Facility Soils, Former Omaha and Grant Smelter. December 16.
- EMSI, 2015. Data Summary Report, Environmental Conditions Investigation High Street Outfall and 40th Avenue, Storm Sewer System. September 18.
- EMSI, 2016a. Final Design Report Environmental Components for Globeville Landing Outfall Project. Vasquez Boulevard/Interstate 70 Site, Operable Unit #2 Removal Action. February 5.
- EMSI, 2016b. Addendum 1 Data Summary Report Environmental Conditions Investigation, High Street Outfall and 40th Avenue, Storm Sewer System, Vasquez Boulevard/Interstate 70 Site, Operable Unit #2 Removal Action. March 15.



SUMMARY REPORT - 8.0 REFERENCES CITED

- EMSI, 2016c. Addendum 1 Final Design Report, Environmental Components for Globeville Landing Outfall Project. August 15.
- EMSI, 2016d. Addendum 2 Final Design Report, Environmental Components for Globeville Landing Outfall Project. November 28.
- EMSI, 2018. Addendum 3 Final Design Report, Environmental Components for Globeville Landing Outfall Project. January 31.
- EPA, 2002b. Supplemental guidance for developing soil screening levels for superfund sites. OSWER 9355.4-24. U. S. Environmental Protection Agency, Solid Waste and Emergency Response, Washington, DC, with technical assistance from Syracuse Research Corporation, Syracuse, NY.
- EPA, 2003. Letter response to the 2002 Globeville Landing Park sampling report. Re: Globeville Landing Park. April 3.
- EPA, 2006. Draft Baseline Human Health and Screening Level Ecological Risk Assessment for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, Colorado. EPA Region 8 and Syracuse Research Corporation, October
- EPA, 2009a. Final Screening-level Ecological Risk Assessment (SLERA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, Colorado. August.
- EPA, 2009b. Final Baseline Human Health Risk Assessment (HHRA) for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, Colorado. August.
- EPA, 2018. Regional Screening Levels (RSLs) – Generic Tables. November
<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>
- PWT, 2012. Supplemental Sampling Program Quality Assurance Project Plan, Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2 (Omaha and Grand Smelter), City and County of Denver, Colorado.
- PWT, 2013. Vasquez Boulevard/Interstate 70 Superfund Site Operable Unit 2, Denver, Colorado, Groundwater Summary Report. May
- PWT, 2014. Vasquez Boulevard/Interstate 70 Superfund Site, Operable Unit 2, Denver, Colorado. May.
- Sewern Trent Services, 2001. Analytical Report, Project No. 161799.TS.07, City of Denver Groundwater. June 7.
- Transportation & Industrial Services, Inc., 2001a. Soil Testing for Lead & Arsenic, New Fleet Maintenance Building, Area 4, for the Pepsi Bottling Group. September 23.
- Transportation & Industrial Services, Inc., 2001b. Soil Testing for Lead & Arsenic, North Court Loading Docks and Related Paving, Area 3, for the Pepsi Bottling Group. October 29.
- Transportation & Industrial Services, Inc., 2001c. Soil Testing for Lead & Arsenic, Plastic Bottle Line Project Utility Trenches, for the Pepsi Bottling Group. November 4.
- Transportation & Industrial Services, Inc., 2002. Soil Testing for Lead & Arsenic, New Bulk Bottle Receiving Building, Area 6, for the Pepsi Bottling Group. April 12.
- URS, 2004. Phase II Report for Targeted Brownfields Assessment, Brighton Boulevard Site, City and County of Denver, Colorado. April 22.
- Walsh Environmental Scientists and Engineers, Inc. (Walsh), 1991a. Preliminary Site Investigation of the Properties at the Intersection of Washington Street and Interstate 70. February 27



SUMMARY REPORT - 8.0 REFERENCES CITED

Walsh, 1991b. Preliminary Site Investigation of the Properties for Modification of I-70, Washington to Brighton Boulevard. July 31

Walsh, 1997. Site Investigation Phase I Construction I-70 Modifications, North Washington Street to Humboldt Avenue, Denver, CO. July 31.

Weston Solutions, 2017a. VB I-70/OU2 Time Critical Removal, Denver County, Colorado. March 17.

Weston Solutions, 2017b. VB I-70/OU2 Time Critical Removal, Denver County, Colorado. June 21.



TABLES



Table 2-1

List of Monitoring Wells and Piezometers

VB/I-70 Superfund Site, OU2

Loc ID	Year Installed	Status	Location Relative to Site Boundary	Gradient Location	Northing ¹	Easting ¹	Total Depth (feet)	Ground Elevation	TOC Elevation	Casing Diameter (inches)
ASARCO Monitoring Wells										
QUAD-1	Unknown	Existing	Off-site	Down-gradient	1709258.25	3148916.40	35	unknown	unknown	unknown
QUAD-2	Unknown	Existing	On-site	Down/cross-gradient	1708966.44	3148919.10	35	unknown	unknown	unknown
QUAD-3	Unknown	Existing	On-site	Down/cross-gradient	1708959.01	3148611.08	25	unknown	unknown	unknown
QUAD-4	Unknown	Existing	Off-site	Down-gradient	1709257.58	3148611.08	25	unknown	unknown	unknown
Walsh Monitoring Wells										
DC-2	1997	Abandoned	On-site	Down/cross-gradient	1709326.96	3148414.37	22	unknown	unknown	2
DC-3	1997	Abandoned	On-site	Down/cross-gradient	1709309.90	3148198.67	20	unknown	unknown	2
DC-4	1997	Abandoned	On-site	Down/cross-gradient	1709231.81	3147905.90	18	unknown	unknown	2
ASARCO Monitoring Wells										
MW-01	2004	Abandoned	On-site	Down/cross-gradient	1708732.35	3147158.77	29	5173.67	5173.50	2
MW-02	2005	Existing	On-site	Down/cross-gradient	1709183.92	3147657.53	19	5162.02	5161.66	2
MW-03	2004	Abandoned	On-site	Down/cross-gradient	1709228.21	3148228.30	20	5163.72	5163.34	2
MW-05	2005	Abandoned	Off-site	Upgradient	1707710.22	3148804.43	38.5	5189.84	5189.62	2
MW-06	2005	Abandoned	Off-site	Upgradient	1707313.42	3148484.39	39	5192.42	5192.08	2
2010 High Street Temporary Piezometers										
HS-01	2010	Abandoned	On-site	Down/cross-gradient	1708495.00	3147060.39	unknown	unknown	unknown	1
HS-02	2010	Abandoned	On-site	Cross-gradient	1708540.45	3147863.84	unknown	unknown	unknown	1
HS-03	2010	Abandoned	On-site	Cross-gradient	1708302.12	3148123.05	unknown	unknown	unknown	1
HS-04	2010	Abandoned	On-site	Cross-gradient	1708144.87	3148254.50	unknown	unknown	unknown	1
HS-05	2010	Abandoned	Off-site	Upgradient	1707413.91	3148167.28	unknown	unknown	unknown	1
HS-07	2010	Abandoned	Off-site	Upgradient	1706669.43	3148796.28	unknown	unknown	unknown	1
HS-08	2010	Abandoned	On-site	Cross-gradient	1708531.85	3147408.06	unknown	unknown	unknown	1
CTL Thompson Monitoring Wells										
CTL MW-1	2011	Abandoned	Off-site	Upgradient	1707492.45	3148160.79	34	5189	unknown	2
CTL MW-2	2011	Abandoned	Off-site	Upgradient	1707895.43	3148551.97	35	5189	unknown	2
CTL MW-3	2011	Abandoned	On-site	Cross-gradient	1708149.60	3148409.95	35	5190	unknown	2
CTL MW-4	2011	Existing	On-site	Cross-gradient	1708365.39	3147930.87	35	5172	unknown	2
CTL MW-5	2011	Existing	On-site	Cross-gradient	1708290.42	3147565.90	28	5171	unknown	2
CTL MW-6	2011	Abandoned	On-site	Cross-gradient	1708215.29	3147172.82	30	5180	unknown	2
SWDI Temporary Piezometers										
SWDI-1	2015	Abandoned	On-site	Cross-gradient	1708442.31	3147949.42	20	5170.93	5170.50	1
SWDI-2	2015	Abandoned	On-site	Cross-gradient	1708363.86	3147903.60	25	5171.14	5170.73	1
SWDI-3	2015	Abandoned	On-site	Cross-gradient	1708511.75	3147863.35	25	5166.25	5165.80	1
SWDI-4	2015	Abandoned	On-site	Cross-gradient	1708539.17	3147612.44	25	5166.55	5166.16	1

Table 2-1

List of Monitoring Wells and Piezometers

VB/I-70 Superfund Site, OU2

Loc ID	Year Installed	Status	Location Relative to Site Boundary	Gradient Location	Northing ¹	Easting ¹	Total Depth (feet)	Ground Elevation	TOC Elevation	Casing Diameter (inches)
SWDI-5	2015	Existing	On-site	Cross-gradient	1708447.04	3147700.93	26	5167.89	5167.44	1
SWDI-6	2015	Existing	On-site	Cross-gradient	1708350.83	3147613.61	26	5169.58	5169.12	1
SWDI-7	2015	Abandoned	On-site	Cross-gradient	1708447.80	3147531.53	25	5169.30	5168.91	1
SWDI-8	2015	Abandoned	On-site	Cross-gradient	1708338.01	3147509.27	28	5171.78	5171.06	1
SWDI-9	2015	Abandoned	On-site	Cross-gradient	1708427.37	3147304.97	25	5175.39	5175.01	1
SWDI-10	2015	Abandoned	On-site	Cross-gradient	1708294.70	3147206.19	32	5177.16	5176.45	1
SWDI-12	2015	Abandoned	On-site	Cross-gradient	1708335.42	3147126.87	26.5	5174.79	5174.38	1
SWDI-13	2015	Abandoned	On-site	Cross-gradient	1708279.27	3147003.79	19	5163.22	5162.84	1
SWDI Temporary Piezometers										
SWDI-14	2015	Abandoned	On-site	Cross-gradient	1708278.12	3146913.84	9	5154.04	5153.73	1
SWDI-15	2015	Abandoned	On-site	Cross-gradient	1708420.25	3147086.38	25	5174.64	5174.34	1
SWDI-16	2015	Abandoned	On-site	Down/cross-gradient	1708461.54	3146893.27	16	5153.91	5153.60	1
2015 Temporary Piezometers - Addendum 1 Data Summary Report										
TH-45	2015	Abandoned	Off-site	Upgradient	1707812.33	3146781.63	unknown	unknown	5152.55	1
TH-46	2015	Abandoned	Off-site	Upgradient	1707885.51	3146837.42	unknown	unknown	5160.20	1
TH-47	2015	Abandoned	Off-site	Upgradient	1707994.95	3146864.90	unknown	unknown	5161.20	1
TH-48	2015	Abandoned	On-site	Down/cross-gradient	1708250.26	3146919.65	unknown	unknown	5155.93	1
TH-52	2015	Abandoned	On-site	Down/cross-gradient	1708432.24	3146890.49	unknown	unknown	5153.40	1
Temporary Wells For 2016 Pump Test										
PW-1	2016	Abandoned	On-site	Cross-gradient	1708282.92	3147163.44	34	5178.34	5177.92	4
PW-2	2016	Abandoned	On-site	Cross-gradient	1708433.54	3147423.19	29	5168.52	5168.07	4
2018 Piezometers										
PZ-1	2018	Existing	On-site	Down/cross-gradient	1708407.91	3147398.33	22.71	Not Measured	5168.518	2
PZ-2	2018	Existing	On-site	Down/cross-gradient	1708298.97	3147259.46	21.19	Not Measured	5163.425	2
PZ-3	2018	Existing	On-site	Down/cross-gradient	1708197.83	3147172.77	22.04	Not Measured	5163.831	2

Notes and Abbreviations:

1. Coordinates in State Plane, Colorado Central zone (FIPS 0502), NAD83, US feet

n/a - not applicable

TOC - top of casing

Table 3-1
Screening Criteria Levels
VB/I-70 Superfund Site, OU2

CAS Number	Chemical Name	Residential Soil RSL ¹ (mg/kg)	Industrial Soil RSL ¹ (mg/kg)	Background Soil SL ² (mg/kg)	CO Reg 41 GSL ^{3,4,5} (µg/L)
630-20-6	1,1,1,2-Tetrachloroethane	2.0	8.8	—	0.18
71-55-6	1,1,1-Trichloroethane	810	3600	—	200 ^(M)
79-34-5	1,1,2,2-Tetrachloroethane	0.60	2.70	—	0.18
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	670	2800	—	—
79-00-5	1,1,2-Trichloroethane	0.15	0.63	—	5 ^(M)
75-34-3	1,1-Dichloroethane	3.6	16	—	5
75-35-4	1,1-Dichloroethene	23	100	—	7
87-61-6	1,2,3-Trichlorobenzene	6.3	93.0	—	—
96-18-4	1,2,3-Trichloropropane	0.01	0.11	—	0.00037
95-94-3	1,2,4,5-Tetrachlorobenzene	2.3	35	—	2.1
120-82-1	1,2,4-Trichlorobenzene	5.8	26	—	70
95-63-6	1,2,4-Trimethylbenzene	30	180	—	70
96-12-8	1,2-Dibromo-3-chloropropane	0.01	0.06	—	0.2
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.04	0.16	—	0.05 ^(M)
95-50-1	1,2-Dichlorobenzene	180	930	—	600
107-06-2	1,2-Dichloroethane	0.46	2.0	—	5 ^(M)
78-87-5	1,2-Dichloropropane	1.6	6.6	—	5 ^(M)
541-73-1	1,3-Dichlorobenzene	—	—	—	94
142-28-9	1,3-Dichloropropane	160	2300	—	—
106-46-7	1,4-Dichlorobenzene	2.6	11	—	75
123-91-1	1,4-Dioxane (p-Dioxane)	5.3	24	—	0.35
460-00-4	1-Bromo-4-fluorobenzene	2.3	35	—	—
90-12-0	1-Methylnaphthalene	18	73	—	—
108-60-1	2,2'-oxybis(1-chloro)Propane	310	4700	—	280
58-90-2	2,3,4,6-Tetrachlorophenol	190	2500	—	—
95-95-4	2,4,5-Trichlorophenol	630	8200	—	700
118-79-6	2,4,6-Tribromophenol	57	740	—	—
88-06-2	2,4,6-Trichlorophenol	6.3	82	—	3.2
88-06-2	2,4,6-Trichlorophenol	6.3	82	—	500
120-83-2	2,4-Dichlorophenol	19	250	—	21
105-67-9	2,4-Dimethyl phenol	130	1600	—	140
51-28-5	2,4-Dinitrophenol	13	160	—	14
121-14-2	2,4-Dinitrotoluene	1.7	7.4	—	0.11
606-20-2	2,6-Dinitrotoluene	0.36	1.5	—	—
91-58-7	2-Chloronaphthalene	480	6000	—	560
95-57-8	2-Chlorophenol	39	580	—	35
95-49-8	2-Chlorotoluene	160	2300	—	—
591-78-6	2-Hexanone	20	130	—	35
91-57-6	2-Methylnaphthalene	24	300	—	—
95-48-7	2-Methylphenol (o-Cresol)	320	4100	—	—
88-74-4	2-Nitroaniline	63	800	—	—
91-94-1	3,3'-Dichlorobenzidine	1.20	5.10	—	0.078
534-52-1	4,6-Dinitro-2-methylphenol	0.51	6.60	—	0.27
59-50-7	4-Chloro-3-methylphenol	630	8200	—	210
106-47-8	4-Chloroaniline	2.7	11	—	—
106-43-4	4-Chlorotoluene	160	2300	—	—
106-44-5	4-Methylphenol (p-Cresol)	630	8200	—	—
100-01-6	4-Nitroaniline	25	110	—	—

Table 3-1
Screening Criteria Levels
VB/I-70 Superfund Site, OU2

CAS Number	Chemical Name	Residential Soil RSL ¹ (mg/kg)	Industrial Soil RSL ¹ (mg/kg)	Background Soil SL ² (mg/kg)	CO Reg 41 GSL ^{3,4,5} (µg/L)
83-32-9	Acenaphthene	360	4500	—	420
67-64-1	Acetone	6100	67000	—	6300
98-86-2	Acetophenone	780	12000	—	--
107-02-8	Acrolein	0.01	0.06	—	3.5
309-00-2	Aldrin	0.04	0.18	—	0.0021
319-84-6	alpha Bhc (alpha Hexachlorocyclohexane)	0.09	0.36	—	0.0056
959-98-8	alpha Endosulfan	--	--	—	42
7429-90-5	Aluminum	7700	110000	—	5000
120-12-7	Anthracene	1800	23000	—	2100
7440-36-0	Antimony	3.1	47	—	6
7440-38-2	Arsenic	0.68	3.0	11	10
1912-24-9	Atrazine	2.40	10	—	3
7440-39-3	Barium	1500	22000	—	2000
100-52-7	Benzaldehyde	170	820	—	--
71-43-2	Benzene	1.20	5.10	—	5
92-87-5	Benzidine	0.00053	0.010	—	0.00015
56-55-3	Benzo(a)anthracene	1.1	21	—	0.0048
50-32-8	Benzo(a)pyrene	0.11	2.1	—	0.2 ^(M)
205-99-2	Benzo(b)fluoranthene	1.1	21	—	0.0048
207-08-9	Benzo(k)fluoranthene	11	210	—	0.0048
65-85-0	Benzoic acid	25000	330000	—	--
100-51-6	Benzyl alcohol	630	8200	—	--
85-68-7	Benzyl butyl phthalate	290	1200	—	1400
7440-41-7	Beryllium	16	230	—	4
319-85-7	beta BHC (beta Hexachlorocyclohexane)	0.30	1.3	—	--
33213-65-9	beta Endosulfan	--	--	—	42
92-52-4	Biphenyl (Diphenyl)	4.7	20	—	4.4
111-91-1	bis(2-chloroethoxy) Methane	19	250	—	--
111-44-4	bis(2-chloroethyl) Ether	0.23	1.0	—	0.032
108-60-1	bis(2-chloroisopropyl) Ether	310	4700	—	280
117-81-7	bis(2-ethylhexyl) Phthalate	39	160	—	6 ^(M)
7440-42-8	Boron	1600	23000	—	750
108-86-1	Bromobenzene	29	180	—	56
74-97-5	Bromochloromethane	15	63	—	--
75-27-4	Bromodichloromethane	0.29	1.3	—	0.56
75-25-2	Bromoform	19.00	86	—	4
74-83-9	Bromomethane	0.68	3.0	—	--
7440-43-9	Cadmium	7.1	98	—	5
105-60-2	Caprolactam	3100	40000	—	--
75-15-0	Carbon disulfide	77	350	—	--
56-23-5	Carbon tetrachloride	0.65	2.90	—	5 ^(M)
12789-03-6	Chlordane	1.70	7.70	—	2 ^(M)
16887-00-6	Chloride (As Cl)	--	--	—	250000
108-90-7	Chlorobenzene	28.00	130.00	—	100
75-00-3	Chloroethane	1400	5700	—	--
67-66-3	Chloroform	0.32	1.40	—	3.5
74-87-3	Chloromethane	11.00	46.00	—	--

Table 3-1
Screening Criteria Levels
VB/I-70 Superfund Site, OU2

CAS Number	Chemical Name	Residential Soil RSL ¹ (mg/kg)	Industrial Soil RSL ¹ (mg/kg)	Background Soil SL ² (mg/kg)	CO Reg 41 GSL ^{3,4,5} (µg/L)
16065-83-1	Chromium III	12000	180000	--	--
18540-29-9	Chromium, Hexavalent	0.30	6.30	--	--
7440-47-3	Chromium, Total			--	100
218-01-9	Chrysene	110	2100	--	0.0048
156-59-2	cis-1,2-Dichloroethylene	16	230	--	70 ^(M)
7440-48-4	Cobalt	2.3	35	--	50
7440-50-8	Copper	310	4700	--	50
110-82-7	Cyclohexane	650	2700	--	--
53-70-3	Dibenz(a,h)anthracene	0.11	2.1	--	0.0048
132-64-9	Dibenzofuran	7.3	100	--	--
124-48-1	Dibromochloromethane	8.30	39	--	14
74-95-3	Dibromomethane	2.4	9.9	--	--
75-71-8	Dichlorodifluoromethane	8.7	37	--	--
60-57-1	Dieldrin	0.03	0.14	--	0.002
60-29-7	Diethyl ether (Ethyl ether)	1600	23000	--	--
84-66-2	Diethyl Phthalate	5100	66000	--	5600
84-74-2	Di-n-butyl phthalate	630	8200	--	700
117-84-0	Di-n-octylphthalate	63	820	--	--
1031-07-8	Endosulfan sulfate	--	--	--	42
72-20-8	Endrin	1.9	25	--	2.0
7421-93-4	Endrin aldehyde	--	--	--	2.1
100-41-4	Ethylbenzene	5.8	25	--	700
206-44-0	Fluoranthene	240	3000	--	280
86-73-7	Fluorene	240	3000	--	280
58-89-9	gamma BHC (Lindane)	0.57	2.50	--	0.2
76-44-8	Heptachlor	0.13	0.63	--	0.4 ^(M)
1024-57-3	Heptachlor epoxide	0.07	0.33	--	0.2 ^(M)
118-74-1	Hexachlorobenzene	0.21	0.96	--	1.0 ^(M)
87-68-3	Hexachlorobutadiene	1.2	5.3	--	0.45
77-47-4	Hexachlorocyclopentadiene	0.18	0.75	--	50 ^(M)
67-72-1	Hexachloroethane	1.8	8.0	--	0.88
193-39-5	Indeno(1,2,3-c,d)Pyrene	1.10	21	--	0.0048
7439-89-6	Iron	5500	82000	--	300
78-59-1	Isophorone	570	2400	--	140
98-82-8	Isopropylbenzene (Cumene)	190	990	--	--
7439-92-1	Lead	400	800	--	50
7439-96-5	Manganese		180.00	--	50
7439-97-6	Mercury	1.1	4.6	--	2
72-43-5	Methoxychlor	32	410	--	40 ^(M)
79-20-9	Methyl acetate	7800	120000	--	--
78-93-3	Methyl ethyl ketone (2-Butanone)	2700	19000	--	--
75-09-2	Methylene chloride	35	320	--	5 ^(M)
7439-98-7	Molybdenum	39	580	--	210
91-20-3	Naphthalene	3.8	17	--	140
104-51-8	n-Butylbenzene	390	5800	--	--
7440-02-0	Nickel	150	2200	--	100
98-95-3	Nitrobenzene	5.1	22	--	14
14797-55-8	Nitrogen, Nitrate (as N)	13000	190000	--	--

Table 3-1
Screening Criteria Levels
VB/I-70 Superfund Site, OU2

CAS Number	Chemical Name	Residential Soil RSL ¹ (mg/kg)	Industrial Soil RSL ¹ (mg/kg)	Background Soil SL ² (mg/kg)	CO Reg 41 GSL ^{3,4,5} (µg/L)
14797-65-0	Nitrogen, Nitrite	780	12000	--	--
621-64-7	n-Nitrosodiisopropylamine	0.08	0.33	--	0.005
621-64-7	n-Nitroso-di-n-propylamine	0.08	0.33	--	0.005
86-30-6	n-Nitrosodiphenylamine	110	470	--	7.1
103-65-1	n-Propylbenzene	380	2400	--	--
95-47-6	o-Xylene (1,2-Dimethylbenzene)	65	280	--	--
72-54-8	p,p'-DDD	0.19	2.5	--	0.15
72-55-9	p,p'-DDE	2.0	9.3	--	0.1
50-29-3	p,p'-DDT	1.9	8.5	--	0.1
1336-36-3	Pcb, Total	0.23	0.94	--	0.5 ^(M)
12674-11-2	PCB-1016 (Arochlor 1016)	0.41	5.1	--	--
11104-28-2	PCB-1221 (Arochlor 1221)	0.20	0.83	--	--
11141-16-5	PCB-1232 (Arochlor 1232)	0.17	0.72	--	--
53469-21-9	PCB-1242 (Arochlor 1242)	0.23	0.95	--	--
12672-29-6	PCB-1248 (Arochlor 1248)	0.23	0.95	--	--
11097-69-1	PCB-1254 (Arochlor 1254)	0.12	0.97	--	--
11096-82-5	PCB-1260 (Arochlor 1260)	0.24	0.99	--	--
87-86-5	Pentachlorophenol	1.0	4.0	--	1.0 ^(M)
108-95-2	Phenol	1900	25000	--	2100
129-00-0	Pyrene	180	2300	--	210
135-98-8	sec-Butylbenzene	780	12000	--	--
7782-49-2	Selenium	39	580	--	50
7440-22-4	Silver	39	580	--	50
100-42-5	Styrene	600	3500	--	100
14808-79-8	Sulfate (As SO4)	--	--	--	250000
98-06-6	t-Butylbenzene	780	12000	--	--
1634-04-4	tert-Butyl methyl ether	47	210	--	--
127-18-4	Tetrachloroethylene (PCE)	8.1	39	--	5 ^(M)
7440-28-0	Thallium	0.078	1.2	--	2
108-88-3	Toluene	490	4700	--	1000 ^(M)
542-75-6	Total, 1,3-Dichloropropene	1.8	8.2	--	--
8001-35-2	Toxaphene	0.49	2.1	--	3 ^(M)
156-60-5	trans-1,2-Dichloroethene	160	2300	--	100 ^(M)
79-01-6	Trichloroethylene (TCE)	0.41	1.90	--	5
75-69-4	Trichlorofluoromethane	2300	35000	--	--
7440-61-1	Uranium	--	--	--	30
7440-62-2	Vanadium	39	580	--	100 ^(a)
108-05-4	Vinyl acetate	91	380	--	--
75-01-4	Vinyl chloride	0.06	1.70	--	2 ^(M)
1330-20-7	Xylenes, Total	58	250	--	10000 ^(M)
7440-66-6	Zinc	2300	35000	--	5000

Notes and Abbreviations:

1. USEPA Regional Screening Levels for a THQ of 0.1 is provided for the soil screening.
2. The average background concentration for all land uses was used based on Region 8 USEPA 95% UCLM Background Soil Arsenic Concentrations in Colorado.
3. Colorado Regulation No. 41 - The Basic Standards For Groundwater (5CCR 1002-41).

Table 3-1
Screening Criteria Levels
VB/I-70 Superfund Site, OU2

Notes and Abbreviations (Continued):

4. For inorganics, if a domestic water supply and agricultural standard both exist, the value for domestic water supply is listed. If no domestic water supply standard was listed, the agricultural standard is listed and marked with an (a).

5. For organics, if more than one value is listed in Reg 41, the maximum contaminant level is listed. These cases are marked with an (m).

UCLM - upper confidence limit mean

mg/kg - milligram per kilogram

RSL - Regional Screening Level

µg/L - micrograms per liter

GSL - Groundwater Screening Level

Table 5-1

Arsenic and Lead Soil Data
 VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	—
3801 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	<u>11</u>	140 J
3801 Brighton-S-02	23-Jun-05	0 - 0.17	Shallow	<u>94</u>	640 J
3801 Brighton-S-03	23-Jun-05	0 - 0.17	Shallow	<u>15</u>	260 J
3801 Brighton-S-04	23-Jun-05	0 - 0.17	Shallow	<u>15</u>	170 J
3801 Brighton-S-05	23-Jun-05	0 - 0.17	Shallow	<u>8.3</u>	98 J
3801 Brighton-S-06	23-Jun-05	0 - 0.17	Shallow	<u>15</u>	230 J
3801 Brighton-S-07	23-Jun-05	0 - 0.17	Shallow	<u>18</u>	200 J
3801 Brighton-S-08	23-Jun-05	0 - 0.17	Shallow	<u>22</u>	230 J
3801 Brighton-S-09	23-Jun-05	0 - 0.17	Shallow	<u>85</u>	790 J
4201 Brighton-S-01	20-Dec-04	0 - 0.17	Shallow	<u>34</u>	540
4201 Brighton-S-02	20-Dec-04	0 - 0.17	Shallow	<u>48</u>	1600
4201 Brighton-S-03	20-Dec-04	0 - 0.17	Shallow	<u>36</u>	1300
4201 Brighton-S-04	20-Dec-04	0 - 0.17	Shallow	<u>86</u>	880
4201 Brighton-S-05	20-Dec-04	0 - 0.17	Shallow	<u>88</u>	36
4301 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	<u>9.9</u>	330 J
4375 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	<u>23</u>	470 J
4375 Brighton-S-02	23-Jun-05	0 - 0.17	Shallow	<u>21</u>	230 J
4600 Humbolt-S-01	17-Dec-04	0 - 0.17	Shallow	<u>27</u>	380
4600 Humbolt-S-02	17-Dec-04	0 - 0.17	Shallow	<u>27</u>	380
4600 Humbolt-S-03	17-Dec-04	0 - 0.17	Shallow	<u>46</u>	380
4600 Humbolt-S-04	17-Dec-04	0 - 0.17	Shallow	<u>11</u>	82
4600 Humbolt-S-05	17-Dec-04	0 - 0.17	Shallow	<u>7.1</u>	110
4600 Humbolt-S-06	17-Dec-04	0 - 0.17	Shallow	<u>7.5</u>	170
4600 Humbolt-S-07	17-Dec-04	0 - 0.17	Shallow	<u>6.4</u>	190
4600 Humbolt-S-08	17-Dec-04	0 - 0.17	Shallow	<u>6.4</u>	110
4600 Humbolt-S-09	17-Dec-04	0 - 0.17	Shallow	<u>13</u>	230
4600 Humbolt-S-10	17-Dec-04	0 - 0.17	Shallow	<u>17</u>	260
A3-1	18-Oct-01	0 - 2	Shallow	<u>52</u>	290
A3-2	18-Oct-01	0 - 2	Shallow	<u>9.4</u>	90
A3-3	18-Oct-01	0 - 2	Shallow	<8.1	37
A3-4	18-Oct-01	0 - 2	Shallow	<8.3	60
A3-5	18-Oct-01	0 - 2	Shallow	<8.1	66
A3-6	18-Oct-01	0 - 2	Shallow	<8.1	93
A3-7	18-Oct-01	0 - 2	Shallow	<u>61</u>	260
A3-8	18-Oct-01	0 - 2	Shallow	<8.3	88
A3-10	18-Oct-01	0 - 2	Shallow	<u>55</u>	430
A3-11	18-Oct-01	0 - 2	Shallow	<u>9</u>	110
A3-12	18-Oct-01	0 - 2	Shallow	<u>50</u>	370
A3-13	18-Oct-01	0 - 2	Shallow	<u>30</u>	340
A3-14	18-Oct-01	0 - 2	Shallow	<8.2	300
A3-15	18-Oct-01	0 - 2	Shallow	<u>65</u>	610
A3-16	18-Oct-01	0 - 2	Shallow	<u>18</u>	150
A3-17	18-Oct-01	0 - 2	Shallow	<u>21</u>	290
A3-18	18-Oct-01	0 - 2	Shallow	<7.6	11
A3-20	18-Oct-01	0 - 2	Shallow	<u>8.6</u>	350
A4-10	05-Sep-01	0 - 1.8	Shallow	<u>20</u>	230
A4-11	05-Sep-01	0 - 1.2	Shallow	<u>55</u>	380
A4-12	05-Sep-01	0 - 2	Shallow	<u>29</u>	310

Table 5-1

Arsenic and Lead Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	--
A4-15	05-Sep-01	0 - 1.6	Shallow	<u>38</u>	270
A4-16	05-Sep-01	0 - 1.4	Shallow	<u>44</u>	390
BB-38-22	07-May-03	0 - 0	Shallow	<u>2</u>	49
BB-38-25	25-Apr-03	0 - 0	Shallow	<u>5</u>	80
BB-BB-26	07-May-03	0 - 0	Shallow	<u><3</u>	2
BB-BB-27	30-Apr-03	0 - 0	Shallow	<u>11</u>	166
BB-CT-40	21-May-03	0 - 0	Shallow	<u>2 J</u>	16
BH-01	15-Dec-04	1.5 - 1.5	Shallow	<u>30</u>	240
BH-02	14-Dec-04	1.7 - 1.7	Shallow	<u>48</u>	<u>1400</u>
BH-03	15-Dec-04	0.7 - 0.7	Shallow	<u>22</u>	<u>1200</u>
BH-04	20-Dec-04	1 - 1	Shallow	<u>16</u>	<u>460</u>
BH-06	15-Dec-04	0.9 - 0.9	Shallow	<u>270</u>	<u>34000</u>
BH-07	28-Mar-05	0.4 - 0.7	Shallow	<u>510</u>	<u>15000</u>
BH-07	28-Mar-05	1.5 - 1.8	Shallow	<u>17</u>	180
MW-01	14-Dec-04	2 - 2	Shallow	<u>7.8</u>	180
MW-03	14-Dec-04	1.8 - 1.8	Shallow	<u>23</u>	<u>950</u>
MW-05	28-Mar-05	0.7 - 1.2	Shallow	<u>23</u>	<u>530</u>
SB-2-1	18-Dec-08	0 - 2	Shallow	<u>1.4</u>	7
SB-2-2	18-Dec-08	0 - 2	Shallow	<u>7.7</u>	280
SB-2-3	18-Dec-08	0 - 2	Shallow	<u>2.4</u>	1.9
SB-2-4	18-Dec-08	0 - 2	Shallow	<u>7.4</u>	160
SB-3-1	17-Dec-08	0 - 2	Shallow	<u>5.9 J</u>	190
SB-3-2	17-Dec-08	0 - 2	Shallow	<u>2.9</u>	13
SB-3-3	17-Dec-08	0 - 2	Shallow	<u>7.8 J</u>	140
SB-3-4	17-Dec-08	0 - 2	Shallow	<u>4.6 J</u>	270
SB-3-5	18-Dec-08	0 - 2	Shallow	<u>5.9</u>	180
SB-4-1	18-Dec-08	0 - 2	Shallow	<u>3</u>	30
SB-4-2	18-Dec-08	0 - 2	Shallow	<u>3.4</u>	55
SB-4-3	17-Dec-08	0 - 2	Shallow	<u>3.4</u>	39
SB-4-4	17-Dec-08	0 - 2	Shallow	<u>5.3</u>	150
SB-4-5	18-Dec-08	0 - 2	Shallow	<u>1.5</u>	12
SS-3-1	17-Dec-08	0 - 2	Shallow	<u>7.6 J</u>	130
SWDI-49	17-Oct-16	0 - 1	Shallow	<u>4.6</u>	23
SWDI-49	17-Oct-16	1 - 2	Shallow	<u>3.8</u>	14
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	<u>3.4</u>	21.2
VB10220303 (Excavations 1 and 2)	22-Oct-03	0 - 0.5	Shallow	<u>17</u>	590
VB10220307 (Excavations 5 - 8)	22-Oct-03	0 - 0.5	Shallow	<u>6.9</u>	110
A4-1	05-Sep-01	0 - 3	Subsurface	<u>79</u>	<u>1100</u>
A4-2	05-Sep-01	0 - 2.5	Subsurface	<u>3.9</u>	27
A4-3	05-Sep-01	0 - 3	Subsurface	<u>32</u>	360
A4-4	05-Sep-01	0 - 2.8	Subsurface	<u>63</u>	580
A4-5	05-Sep-01	0 - 3	Subsurface	<u>18</u>	240
A4-6	05-Sep-01	0 - 3	Subsurface	<u>54</u>	570
A4-7	05-Sep-01	0 - 2.6	Subsurface	<u>37</u>	520

Table 5-1

Arsenic and Lead Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	—
A4-8	05-Sep-01	0 - 3	Subsurface	<u>85</u>	600
A4-9	05-Sep-01	0 - 3	Subsurface	<u>27</u>	280
A4-13	05-Sep-01	0 - 2.6	Subsurface	<u>33</u>	410
A4-14	05-Sep-01	0 - 2.2	Subsurface	<u>17</u>	210
A6-1	15-Oct-01	0 - 10	Subsurface	<u>9.2</u>	210
A6-2	15-Oct-01	0 - 10	Subsurface	<u>16</u>	630
A6-3	15-Oct-01	0 - 10	Subsurface	<u>23</u>	400
A6-4	15-Oct-01	0 - 10	Subsurface	<u>19</u>	1500
A6-5	15-Oct-01	0 - 10	Subsurface	<u>19</u>	160
A6-6	15-Oct-01	0 - 10	Subsurface	<u>10</u>	300
A7-1	15-Oct-02	0 - 6	Subsurface	<u>73</u>	560
A7-2	17-Oct-02	0 - 6	Subsurface	<u>9.5</u>	130
A7-3	17-Oct-02	0 - 6	Subsurface	<7.6	33
A7-4	17-Oct-02	0 - 6	Subsurface	<u>7.7</u>	39
A7-5	15-Oct-02	0 - 6	Subsurface	<7.6	71
A7-6	15-Oct-02	0 - 6	Subsurface	<u>24</u>	240
A7-7	17-Oct-02	0 - 6	Subsurface	<u>12</u>	85
A7-8	15-Oct-02	0 - 6	Subsurface	<u>8</u>	61
A7-9	17-Oct-02	0 - 6	Subsurface	<u>8</u>	120
A7-10	15-Oct-02	0 - 6	Subsurface	<u>12</u>	200
BB-CT-38	21-May-03	4 - 4	Subsurface	1 J	3
BH-01	15-Dec-04	6.8 - 6.8	Subsurface	<u>21</u>	250
BH-01	15-Dec-04	9.5 - 9.5	Subsurface	<u>46</u>	300
BH-02	14-Dec-04	4.5 - 4.5	Subsurface	<u>21</u>	330
BH-02	14-Dec-04	9 - 9	Subsurface	<u>15</u>	180
BH-03	15-Dec-04	6 - 6	Subsurface	<6	75
BH-04	20-Dec-04	3 - 3	Subsurface	<u>14</u>	330
BH-05	24-Mar-05	2 - 2.5	Subsurface	<u>420</u>	2900
BH-05	24-Mar-05	6.5 - 7	Subsurface	<u>15</u>	230
BH-06	15-Dec-04	5.5 - 5.5	Subsurface	<6	12
BH-07	28-Mar-05	5.6 - 6	Subsurface	<6	8.9
BH-07	28-Mar-05	9.5 - 10	Subsurface	<6	17
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	2.2	11.5
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	6.8	205
DC-1	30-May-97	0 - 20	Subsurface	1.5	6.1
DC-2	30-May-97	0.5 - 22	Subsurface	<u>13</u>	170
DC-3	30-May-97	0.5 - 20	Subsurface	6.1	98
DC-4	02-Jun-97	1 - 17	Subsurface	3.5	110
DC-5	02-Jun-97	1 - 13.5	Subsurface	<u>17</u>	210
DC-6	02-Jun-97	1 - 20	Subsurface	5.3	37
DC-7	02-Jun-97	1 - 17	Subsurface	2.6	20
DC-8	02-Jun-97	0 - 15	Subsurface	7.4	410
HS-02	25-Feb-10	5 - 15	Subsurface	3.7	97.2
MW-01	14-Dec-04	6 - 6	Subsurface	<u>31</u>	260
MW-02	24-Mar-05	2 - 2.5	Subsurface	<6	130
MW-02	24-Mar-05	5 - 5.5	Subsurface	59	3600
MW-03	14-Dec-04	5.5 - 5.5	Subsurface	<u>13</u>	320
MW-03	14-Dec-04	9 - 9	Subsurface	8.8	1600

Table 5-1

Arsenic and Lead Soil Data
 VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	--
MW-05	28-Mar-05	4.5 - 5	Subsurface	<6	6.3
MW-05	28-Mar-05	9.5 - 10	Subsurface	<6	14
MW-06	24-Mar-05	1.6 - 2.1	Subsurface	<u>100</u>	<u>3300</u>
MW-06	24-Mar-05	5 - 5.5	Subsurface	<6	7.2
SB-01	24-Jul-02	2 - 3	Subsurface	<u>11.1</u>	185 J
SB-01	24-Jul-02	4 - 6	Subsurface	<u>7.38</u>	147 J
SB-02	24-Jul-02	2 - 3	Subsurface	<u>6.14</u>	148 J
SB-03	24-Jul-02	2 - 3	Subsurface	<u>6.55</u>	120 J
SB-03	24-Jul-02	4 - 6	Subsurface	<u>9.26</u>	143 J
SB-04	24-Jul-02	2 - 3	Subsurface	<u>7.24</u>	159 J
SB-12	24-Jul-02	2 - 3	Subsurface	<u>8.49</u>	166 J
SB-13	24-Jul-02	2 - 3	Subsurface	<u>3.43</u>	16.7 J
SB-14	24-Jul-02	2 - 3	Subsurface	<u>2.26</u>	46.6 J
SB-22	24-Jul-02	2 - 3	Subsurface	<u>4.85</u>	79 J
SB-29	24-Jul-02	2 - 3	Subsurface	<u>7.65</u>	88.5 J
SB-30	24-Jul-02	2 - 3	Subsurface	<u>2.88 J</u>	87.8 J
SB-31	24-Jul-02	2 - 3	Subsurface	<u>3.89 J</u>	200 J
SB-32	24-Jul-02	2 - 3	Subsurface	<u>3.17 J</u>	50.3 J
SB-2-1	18-Dec-08	2 - 4	Subsurface	<u>2.1</u>	11
SB-2-1	18-Dec-08	4 - 9	Subsurface	<u>0.68</u>	4.8
SB-2-2	18-Dec-08	2 - 4	Subsurface	<u>1.6</u>	18
SB-2-2	18-Dec-08	4 - 9	Subsurface	<u>0.79</u>	4.1
SB-2-4	18-Dec-08	4 - 5	Subsurface	<u>0.95</u>	6.3
SB-3-1	17-Dec-08	4 - 9	Subsurface	<u>32 J</u>	<u>1900</u>
SB-3-2	17-Dec-08	2 - 3	Subsurface	<u>9.7 J</u>	210
SB-3-2	17-Dec-08	4 - 9	Subsurface	<u>2.9</u>	41
SB-3-3	17-Dec-08	4 - 9	Subsurface	<u>1.9 J</u>	22
SB-3-4	17-Dec-08	2 - 4	Subsurface	<u>1.3</u>	14
SB-3-5	18-Dec-08	6 - 8	Subsurface	<u>4.9</u>	26
SB-4-1	18-Dec-08	2 - 4	Subsurface	<u>4.1</u>	51
SB-4-2	18-Dec-08	2 - 4	Subsurface	<u>3.4</u>	61
SB-4-2	18-Dec-08	8 - 9	Subsurface	<u>9.4</u>	290
SB-4-3	17-Dec-08	2 - 4	Subsurface	<u>2.3</u>	64
SB-4-3	17-Dec-08	4 - 9	Subsurface	<u>4.1</u>	62
SB-4-4	17-Dec-08	2 - 4	Subsurface	<u>1.2</u>	17
SB-4-5	18-Dec-08	2 - 4	Subsurface	<u>2.1</u>	21
SB-4-5	18-Dec-08	8 - 9	Subsurface	<u>22</u>	<u>780</u>
SWDI-18	17-Oct-16	8.5 - 11	Subsurface	<u>5.9</u>	140
SWDI-20	17-Oct-16	8.5 - 11	Subsurface	<u>5.9</u>	69
SWDI-32	17-Oct-16	7.8 - 10.3	Subsurface	<u>4.8</u>	150
SWDI-34	19-Oct-16	9.8 - 12.3	Subsurface	<u>1.9 J</u>	2.6 J
SWDI-35	19-Oct-16	9.9 - 12.4	Subsurface	<u>5.9</u>	56
SWDI-36	19-Oct-16	5 - 7.5	Subsurface	<u>23</u>	190
SWDI-41	17-Oct-16	8.8 - 11.3	Subsurface	<u>15</u>	88
SWDI-44	19-Oct-16	2 - 3	Subsurface	<u>8.5</u>	96
SWDI-45	19-Oct-16	2 - 3	Subsurface	<u>3</u>	7.7
SWDI-46	19-Oct-16	2 - 3	Subsurface	<u>4.4</u>	23
SWDI-47	17-Oct-16	2 - 3	Subsurface	<u>13</u>	300

Table 5-1

Arsenic and Lead Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	—
SWDI-49	17-Oct-16	2 - 3	Subsurface	<u>5.3</u>	15
TH-1	1991*	Unknown	Subsurface	0.3	1.1
TH-2	1991*	Unknown	Subsurface	<u>41</u>	<u>3000</u>
TH-3	1991*	Unknown	Subsurface	<u>11</u>	180
TH-4	1991*	Unknown	Subsurface	<u>0.8</u>	6.5
TH-5	1991*	Unknown	Subsurface	<u>2</u>	15
TH-8	1991*	Unknown	Subsurface	<0.8	2.3
TH-9	1991*	Unknown	Subsurface	<0.8	3.4
TH-63	30-Aug-16	0 - 5	Subsurface	<u>20</u>	145
TH-65	30-Aug-16	0 - 5	Subsurface	<u>22.8</u>	<u>459</u>
UT-1	17-Oct-01	0 - 10	Subsurface	<u>11</u>	160
UT-2	17-Oct-01	0 - 10	Subsurface	<u>12</u>	300
UT-3	17-Oct-01	0 - 8	Subsurface	<u>14</u>	<u>940</u>
UT-5	17-Oct-01	0 - 7	Subsurface	<u>9.1</u>	160
UT-6	18-Oct-01	0 - 13	Subsurface	<7.8	180
UT-7	18-Oct-01	0 - 10	Subsurface	<u>630</u>	<u>2800</u>
UT-8	18-Oct-01	0 - 9	Subsurface	<u>16</u>	130
UT-9	18-Oct-01	0 - 8	Subsurface	<7.8	46
UT-10	18-Oct-01	0 - 8	Subsurface	<u>17</u>	210
UT-11	18-Oct-01	0 - 12	Subsurface	<u>42</u>	<u>490</u>
UT-12	18-Oct-01	0 - 9	Subsurface	<u>9.4</u>	370
UT-13	18-Oct-01	0 - 12	Subsurface	<7.4	31
UT-14	18-Oct-01	0 - 11	Subsurface	<u>16</u>	190
VB10220301 (Excavations 3 and 4)	22-Oct-03	0 - 5	Subsurface	<u>14</u>	120
VB10220302 (Excavation 3)	22-Oct-03	5 - 5	Subsurface	<u>24</u>	700
VB10220304 (Excavations 1 - 4)	22-Oct-03	0 - 5	Subsurface	<u>5.5</u>	50
VB10220305 (Excavations 5 and 6)	22-Oct-03	0 - 5	Subsurface	<u>7.4</u>	160
VB10220306 (Excavations 7 and 8)	22-Oct-03	0 - 5	Subsurface	<u>14</u>	330
A6-1	15-Oct-01	10 - 20	Deep	<u>13</u>	110
A6-2	15-Oct-01	10 - 20	Deep	<u>67</u>	540
A6-3	15-Oct-01	10 - 20	Deep	<u>12</u>	220
A6-4	15-Oct-01	10 - 20	Deep	<u>19</u>	410
A6-5	15-Oct-01	10 - 20	Deep	<u>25</u>	190
A6-6	15-Oct-01	10 - 20	Deep	<u>8.3</u>	<u>4900</u>
BH-01	15-Dec-04	14 - 14	Deep	<u>18</u>	220
BH-01	15-Dec-04	24 - 24	Deep	<u>760</u>	<u>2300</u>
BH-03	15-Dec-04	10.2 - 10.2	Deep	<u>950</u>	470
BH-03	15-Dec-04	14 - 14	Deep	<u>1500</u>	<u>100000</u>
BH-03	15-Dec-04	20.6 - 20.6	Deep	<u>880</u>	<25

Table 5-1

Arsenic and Lead Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	--
BH-03	15-Dec-04	28.5 - 28.5	Deep	<u>27</u>	250
BH-05	24-Mar-05	10.4 - 10.9	Deep	<u>85</u>	<u>3000</u>
BH-05	24-Mar-05	16.1 - 16.6	Deep	<6	5.6
BH-05	24-Mar-05	25 - 25.5	Deep	<6	23
BH-06	15-Dec-04	10.5 - 10.5	Deep	<6	14
BH-06	15-Dec-04	15.8 - 15.8	Deep	<6	88
BH-06	15-Dec-04	20 - 20	Deep	<6	<5
BH-07	28-Mar-05	16.5 - 17	Deep	<6	11
BH-07	28-Mar-05	18.5 - 19	Deep	<6	24
HS-01	24-Feb-10	15 - 25	Deep	<u>3.5</u>	29.2
HS-03	25-Feb-10	10 - 15	Deep	<2.1	<4.3
HS-04	25-Feb-10	25 - 35	Deep	<u>2.5</u>	<4.3
HS-05	24-Feb-10	25 - 34	Deep	<2.4	5.2
HS-06	24-Feb-10	12 - 14	Deep	<u>4.3</u>	102
HS-07	24-Feb-10	25 - 35	Deep	<1.9	<3.9
HS-08	25-Feb-10	10 - 20	Deep	<u>7.4</u>	176
MW-01	14-Dec-04	11 - 11	Deep	<6	34
MW-01	14-Dec-04	16.8 - 16.8	Deep	<u>12</u>	130
MW-01	14-Dec-04	19 - 19	Deep	<u>27</u>	<u>830</u>
MW-03	14-Dec-04	19.5 - 19.5	Deep	<u>96</u>	42
MW-05	28-Mar-05	15 - 15.5	Deep	<6	13
MW-05	28-Mar-05	23.7 - 24.1	Deep	<6	5.5
MW-05	28-Mar-05	38 - 38.5	Deep	<u>91</u>	42
MW-06	24-Mar-05	15 - 15.5	Deep	<6	20
MW-06	24-Mar-05	20 - 20.5	Deep	<6	5.4
MW-06	24-Mar-05	34 - 34.3	Deep	<u>22</u>	240
SB-2-3	18-Dec-08	18 - 19	Deep	<u>0.89</u>	6.2
SB-2-3	18-Dec-08	20 - 20.5	Deep	0.27 J	1.1
SB-2-4	18-Dec-08	14 - 15	Deep	<u>1.7</u>	9.1
SB-3-1	17-Dec-08	14 - 15	Deep	<u>1.4 J</u>	1.8
SB-3-2	17-Dec-08	14 - 15	Deep	<u>14 J</u>	190
SB-3-3	17-Dec-08	14 - 15	Deep	<u>1.3 J</u>	2.7
SB-3-4	17-Dec-08	14 - 15	Deep	<u>0.78 J</u>	1.1
SB-3-5	18-Dec-08	10 - 15	Deep	<u>7</u>	140 J
SB-3-5	18-Dec-08	14 - 15	Deep	<u>4.4</u>	82
SB-4-1	18-Dec-08	12 - 14	Deep	<u>14</u>	140
SB-4-2	18-Dec-08	12 - 14	Deep	<u>7</u>	180 J
SB-4-3	17-Dec-08	22 - 24	Deep	<u>18</u>	130
SB-4-4	17-Dec-08	23 - 24.5	Deep	<u>4.6</u>	10
SWDI-1	09-Jul-15	10 - 12	Deep	<u>10</u>	230
SWDI-2	09-Jul-15	10 - 12	Deep	<u>9.6</u>	96
SWDI-3	08-Jul-15	15 - 17	Deep	<u>7.6</u>	110
SWDI-4	08-Jul-15	10 - 12	Deep	<u>67 J</u>	<u>650 J</u>
SWDI-5	08-Jul-15	10 - 12	Deep	<u>29</u>	<u>900</u>
SWDI-6	09-Jul-15	10 - 12	Deep	<u>7.9</u>	120
SWDI-7	08-Jul-15	15 - 17	Deep	<u>2.3</u>	8.5
SWDI-8	09-Jul-15	10 - 12	Deep	<u>8.4 J</u>	98 J
SWDI-10	10-Jul-15	20 - 22	Deep	<u>110</u>	<u>470</u>

Table 5-1

Arsenic and Lead Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Arsenic (mg/Kg)	Lead (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		0.68	400
		Industrial Soil RSL(mg/kg)		3	800
		Background Soil(mg/kg)		11	—
SWDI-13	13-Jul-15	10 - 12	Deep	3.9	11
SWDI-15	13-Jul-15	15 - 17	Deep	5.9	130
SWDI-16	13-Jul-15	15 - 17	Deep	4.2	23
SWDI-17	17-Oct-16	10 - 12.5	Deep	14	580
SWDI-19	17-Oct-16	10.5 - 13	Deep	41	170
SWDI-23	19-Oct-16	19.1 - 21.6	Deep	8.2	11
SWDI-25	17-Oct-16	15.5 - 18	Deep	2.9	7.9
SWDI-27	17-Oct-16	11.1 - 13.6	Deep	1.8	13
SWDI-28	19-Oct-16	11.9 - 12.5	Deep	3.8	12
SWDI-33	17-Oct-16	13.6 - 16.1	Deep	7.5	150
SWDI-37	17-Oct-16	14.4 - 16.9	Deep	32	160
SWDI-38	17-Oct-16	16.7 - 19.2	Deep	8.2	350
SWDI-39	17-Oct-16	13.8 - 16.3	Deep	20	780
SWDI-40	17-Oct-16	13.6 - 16.1	Deep	3.7	25
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	1.6	22.3
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	11.2	162

Notes and Abbreviations:**Bold** indicates a detection above the residential RSL.**Bold** and underlined indicates a detection above the industrial RSL.**Bold** and underlined and red indicates a detection above the background for arsenic.

A "<" indicates the compound was not detected at concentrations above the reporting limit.

* - The full sample date is unknown since the original report could not be located.

The summary provided in WALSH, 1997 for this 1991 sampling only provides the year.

J - indicates an estimated value

mg/kg - milligrams per kilogram

RSL - USEPA Regional Screening Level

Table 5-2a

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Cadmium (mg/Kg)	Zinc (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		7.1	2300
		Industrial Soil RSL(mg/kg)		98	35000
3801 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	2.7	210
3801 Brighton-S-02	23-Jun-05	0 - 0.17	Shallow	5.7	430
3801 Brighton-S-03	23-Jun-05	0 - 0.17	Shallow	2.9	250
3801 Brighton-S-04	23-Jun-05	0 - 0.17	Shallow	4.4	230
3801 Brighton-S-05	23-Jun-05	0 - 0.17	Shallow	<1	130
3801 Brighton-S-06	23-Jun-05	0 - 0.17	Shallow	3.2	220
3801 Brighton-S-07	23-Jun-05	0 - 0.17	Shallow	2.2	180
3801 Brighton-S-08	23-Jun-05	0 - 0.17	Shallow	2.3	210
3801 Brighton-S-09	23-Jun-05	0 - 0.17	Shallow	11	360
4201 Brighton-S-01	20-Dec-04	0 - 0.17	Shallow	6.4	1300
4201 Brighton-S-02	20-Dec-04	0 - 0.17	Shallow	8.1	770
4201 Brighton-S-03	20-Dec-04	0 - 0.17	Shallow	6	580
4201 Brighton-S-04	20-Dec-04	0 - 0.17	Shallow	8.1	440
4201 Brighton-S-05	20-Dec-04	0 - 0.17	Shallow	15	3.5
4301 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	3	470
4375 Brighton-S-01	23-Jun-05	0 - 0.17	Shallow	4.1	350
4375 Brighton-S-02	23-Jun-05	0 - 0.17	Shallow	<0.5	730
4600 Humbolt-S-01	17-Dec-04	0 - 0.17	Shallow	2.7	230
4600 Humbolt-S-02	17-Dec-04	0 - 0.17	Shallow	2.7	230
4600 Humbolt-S-03	17-Dec-04	0 - 0.17	Shallow	4.2	210
4600 Humbolt-S-04	17-Dec-04	0 - 0.17	Shallow	0.93	77
4600 Humbolt-S-05	17-Dec-04	0 - 0.17	Shallow	1.2	240
4600 Humbolt-S-06	17-Dec-04	0 - 0.17	Shallow	1.4	160
4600 Humbolt-S-07	17-Dec-04	0 - 0.17	Shallow	1	150
4600 Humbolt-S-08	17-Dec-04	0 - 0.17	Shallow	1	150
4600 Humbolt-S-09	17-Dec-04	0 - 0.17	Shallow	3.3	250
4600 Humbolt-S-10	17-Dec-04	0 - 0.17	Shallow	5.1	370
BB-38-22	07-May-03	0 - 0	Shallow	<1	93
BB-38-25	25-Apr-03	0 - 0	Shallow	<1	135 J
BB-BB-26	07-May-03	0 - 0	Shallow	<1	9
BB-BB-27	30-Apr-03	0 - 0	Shallow	2	238
BB-CT-40	21-May-03	0 - 0	Shallow	<1	31
BH-01	15-Dec-04	1.5 - 1.5	Shallow	5.2	160
BH-02	14-Dec-04	1.7 - 1.7	Shallow	7.5	1800
BH-03	15-Dec-04	0.7 - 0.7	Shallow	5.8	310
BH-04	20-Dec-04	1 - 1	Shallow	2	690
BH-06	15-Dec-04	0.9 - 0.9	Shallow	100	14000
BH-07	28-Mar-05	0.4 - 0.7	Shallow	25	560
BH-07	28-Mar-05	1.5 - 1.8	Shallow	2.1	190
MW-01	14-Dec-04	2 - 2	Shallow	2.1	190
MW-03	14-Dec-04	1.8 - 1.8	Shallow	3	3400
MW-05	28-Mar-05	0.7 - 1.2	Shallow	7.6	280
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	0.78	49.0
VB10220303 (Excavations 1 and 2)	22-Oct-03	0 - 0.5	Shallow	3.6	--
VB10220307 (Excavations 5 - 8)	22-Oct-03	0 - 0.5	Shallow	1.2	--

Table 5-2a

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Cadmium (mg/Kg)	Zinc (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		7.1	2300
		Industrial Soil RSL(mg/kg)		98	35000
BB-CT-38	21-May-03	4 - 4	Subsurface	<1	10
BH-01	15-Dec-04	6.8 - 6.8	Subsurface	4.9	230
BH-01	15-Dec-04	9.5 - 9.5	Subsurface	9.4	250
BH-02	14-Dec-04	4.5 - 4.5	Subsurface	4.4	620
BH-02	14-Dec-04	9 - 9	Subsurface	1.5	800
BH-03	15-Dec-04	6 - 6	Subsurface	<0.5	82
BH-04	20-Dec-04	3 - 3	Subsurface	1.7	460
BH-05	24-Mar-05	2 - 2.5	Subsurface	37	460
BH-05	24-Mar-05	6.5 - 7	Subsurface	70	480
BH-06	15-Dec-04	5.5 - 5.5	Subsurface	<0.5	27
BH-07	28-Mar-05	5.6 - 6	Subsurface	2.8	420
BH-07	28-Mar-05	9.5 - 10	Subsurface	14	1300
DC-1	30-May-97	0 - 20	Subsurface	0.09	--
DC-2	30-May-97	0.5 - 22	Subsurface	29	--
DC-3	30-May-97	0.5 - 20	Subsurface	0.09	--
DC-4	02-Jun-97	1 - 17	Subsurface	0.65	--
DC-5	02-Jun-97	1 - 13.5	Subsurface	2.8	--
DC-6	02-Jun-97	1 - 20	Subsurface	0.57	--
DC-7	02-Jun-97	1 - 17	Subsurface	0.5	--
DC-8	02-Jun-97	0 - 15	Subsurface	1.5	--
HS-02	25-Feb-10	5 - 15	Subsurface	<0.95	--
MW-01	14-Dec-04	6 - 6	Subsurface	9.1	210
MW-02	24-Mar-05	2 - 2.5	Subsurface	1.3	140
MW-02	24-Mar-05	5 - 5.5	Subsurface	<2.5	19000
MW-03	14-Dec-04	5.5 - 5.5	Subsurface	<2.5	180
MW-03	14-Dec-04	9 - 9	Subsurface	5.5	2400
MW-05	28-Mar-05	4.5 - 5	Subsurface	<0.5	28
MW-05	28-Mar-05	9.5 - 10	Subsurface	<1	61
MW-06	24-Mar-05	1.6 - 2.1	Subsurface	30	3000
MW-06	24-Mar-05	5 - 5.5	Subsurface	2.8	360
SB-3-2	17-Dec-08	4 - 9	Subsurface	1.3	--
TH-1	1991*	Unkown	Subsurface	<1	15
TH-2	1991*	Unkown	Subsurface	<5	25000
TH-3	1991*	Unkown	Subsurface	<1	240
TH-4	1991*	Unkown	Subsurface	2	94
TH-5	1991*	Unkown	Subsurface	<1	42
TH-8	1991*	Unkown	Subsurface	<1	15
TH-9	1991*	Unkown	Subsurface	<1	18
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	1.2	189
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	1.2	337
VB10220301 (Excavations 3 and 4)	22-Oct-03	0 - 5	Subsurface	3.1	--
VB10220302 (Excavation 3)	22-Oct-03	5 - 5	Subsurface	3.4	--
VB10220304 (Excavations 1 - 4)	22-Oct-03	0 - 5	Subsurface	0.56	--
VB10220305 (Excavations 5 and 6)	22-Oct-03	0 - 5	Subsurface	1.2	--

Table 5-2a

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Cadmium (mg/Kg)	Zinc (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		7.1	2300
		Industrial Soil RSL(mg/kg)		98	35000
VB10220306 (Excavations 7 and 8)	22-Oct-03	0 - 5	Subsurface	1.7	--
BH-01	15-Dec-04	14 - 14	Deep	1.9	150
BH-01	15-Dec-04	24 - 24	Deep	<u>230</u>	440
BH-03	15-Dec-04	10.2 - 10.2	Deep	<u>150</u>	26
BH-03	15-Dec-04	14 - 14	Deep	<u>160</u>	84
BH-03	15-Dec-04	20.6 - 20.6	Deep	3.3	160
BH-03	15-Dec-04	28.5 - 28.5	Deep	<0.5	770
BH-05	24-Mar-05	10.4 - 10.9	Deep	33	530
BH-05	24-Mar-05	16.1 - 16.6	Deep	7.9	120
BH-05	24-Mar-05	25 - 25.5	Deep	16	190
BH-06	15-Dec-04	10.5 - 10.5	Deep	<0.5	53
BH-06	15-Dec-04	15.8 - 15.8	Deep	<2.5	71
BH-06	15-Dec-04	20 - 20	Deep	<0.5	17
BH-07	28-Mar-05	16.5 - 17	Deep	17	900
BH-07	28-Mar-05	18.5 - 19	Deep	9.3	550
HS-01	24-Feb-10	15 - 25	Deep	<0.93	--
HS-03	25-Feb-10	10 - 15	Deep	<0.85	--
HS-04	25-Feb-10	25 - 35	Deep	5.6	--
HS-05	24-Feb-10	25 - 34	Deep	<0.96	--
HS-06	24-Feb-10	12 - 14	Deep	<0.83	--
HS-07	24-Feb-10	25 - 35	Deep	<0.78	--
HS-08	25-Feb-10	10 - 20	Deep	1.2	--
MW-01	14-Dec-04	11 - 11	Deep	<0.5	78
MW-01	14-Dec-04	16.8 - 16.8	Deep	1	490
MW-01	14-Dec-04	19 - 19	Deep	3.2	4700
MW-03	14-Dec-04	19.5 - 19.5	Deep	18	5.5
MW-05	28-Mar-05	15 - 15.5	Deep	<1	50
MW-05	28-Mar-05	23.7 - 24.1	Deep	<0.5	20
MW-05	28-Mar-05	38 - 38.5	Deep	18	7.4
MW-06	24-Mar-05	15 - 15.5	Deep	<1	58
MW-06	24-Mar-05	20 - 20.5	Deep	<0.5	10
MW-06	24-Mar-05	34 - 34.3	Deep	<0.5	750
SB-3-4	17-Dec-08	14 - 15	Deep	<0.55	--
SB-3-5	18-Dec-08	10 - 15	Deep	0.67	--
SB-4-2	18-Dec-08	12 - 14	Deep	7.3	--
SB-4-3	17-Dec-08	22 - 24	Deep	7	--
SB-4-4	17-Dec-08	23 - 24.5	Deep	3.3	--

Table 5-2a

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Cadmium (mg/Kg)	Zinc (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		7.1	2300
		Industrial Soil RSL(mg/kg)		98	35000
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	<1.1	39.6
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	2.4	162

Notes and Abbreviations:**Bold** indicates a detection above the residential RSL.**Bold** and underlined indicates a detection above the industrial RSL.

A "<" indicates the compound was not detected at concentrations above the reporting limit. If italicized it displays the method detection limit instead of the reporting limit

J - indicates an estimated value

RSL - USEPA Regional Screening Level

mg/kg - milligrams per kilogram

* - The full sample date is unknown since the original report could not be located.

The summary provided in WALSH, 1997 for this 1991 sampling only provides the year.

Table 5-2b

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Barium (mg/Kg)	Chromium, Total (mg/Kg)	Mercury (mg/Kg)	Selenium (mg/Kg)	Silver (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		1500	--	1.1	39	39
		Industrial Soil RSL(mg/kg)		22000	--	4.6	580	580
BB-38-22	07-May-03	0 - 0	Shallow	86	6	<0.1	<7	<2 J
BB-38-25	25-Apr-03	0 - 0	Shallow	153	9	<0.1	<7	<2 J
BB-BB-26	07-May-03	0 - 0	Shallow	29	1	<0.1	<7	<2
BB-BB-27	30-Apr-03	0 - 0	Shallow	125	11	<0.1	<7	<2 J
BB-CT-40	21-May-03	0 - 0	Shallow	57	4	<0.1	<7	<2
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	93.4	8.4	0.021	<6.7	0.40
VB10220303 (Excavations 1 and 2)	22-Oct-03	0 - 0.5	Shallow	180	13	0.087	0.66	3.6
VB10220307 (Excavations 5 - 8)	22-Oct-03	0 - 0.5	Shallow	170	17	0.11	0.64	0.74
BB-CT-38	21-May-03	4 - 4	Subsurface	21	2	<0.1	<7	<2
DC-1	30-May-97	0 - 20	Subsurface	66	5.9	<0.047	<0.11	0.2
DC-2	30-May-97	0.5 - 22	Subsurface	210	13	0.41	0.49	0.82
DC-3	30-May-97	0.5 - 20	Subsurface	120	7.8	0.12	0.22	4.6
DC-4	02-Jun-97	1 - 17	Subsurface	230	7.6	0.32	0.41	0.5
DC-5	02-Jun-97	1 - 13.5	Subsurface	170	2.9	0.19	1.1	2
DC-6	02-Jun-97	1 - 20	Subsurface	190	7.1	0.072	<0.11	0.29
DC-7	02-Jun-97	1 - 17	Subsurface	150	8.6	0.13	<0.11	0.29
DC-8	02-Jun-97	0 - 15	Subsurface	330	14	0.17	<0.11	1
HS-02	25-Feb-10	5 - 15	Subsurface	99.2	6.5	0.50	<4.8	<2.9
SB-3-2	17-Dec-08	4 - 9	Subsurface	100	8.7	0.028	<1.5	0.28 J
TH-1	1991*	Unknown	Subsurface	22	<2	<0.1	<0.4	<1
TH-2	1991*	Unknown	Subsurface	6600	<10	<0.1	<4	<5
TH-3	1991*	Unknown	Subsurface	210	19	<0.1	<2	<1
TH-4	1991*	Unknown	Subsurface	27	<2	<0.1	<2	<1
TH-5	1991*	Unknown	Subsurface	68	4	<0.1	<0.4	<1
TH-8	1991*	Unknown	Subsurface	36	2	<0.1	<0.4	<1
TH-9	1991*	Unknown	Subsurface	38	4	<0.1	<0.4	<1
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	76.8	11.4	0.017	<5.5	0.31
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	132	12.3	0.16	<5.9	0.69
VB10220301 (Excavations 3 and 4)	22-Oct-03	0 - 5	Subsurface	140	4.5	0.052	0.83	0.56
VB10220302 (Excavation 3)	22-Oct-03	5 - 5	Subsurface	160	11	0.13	0.65	3
VB10220304 (Excavations 1 - 4)	22-Oct-03	0 - 5	Subsurface	150	17	0.025	0.85	0.32
VB10220305 (Excavations 5 and 6)	22-Oct-03	0 - 5	Subsurface	89	8.3	0.053	0.54	0.74

Table 5-2b

Other Metals Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Barium (mg/Kg)	Chromium, Total (mg/Kg)	Mercury (mg/Kg)	Selenium (mg/Kg)	Silver (mg/Kg)
Screening Criteria		Residential Soil RSL(mg/kg)		1500	--	1.1	39	39
		Industrial Soil RSL(mg/kg)		22000	--	4.6	580	580
VB10220306 (Excavations 7 and 8)	22-Oct-03	0 - 5	Subsurface	120	11	0.054	0.78	1.4
HS-01	24-Feb-10	15 - 25	Deep	107	9.6	<0.11	<4.7	<2.8
HS-03	25-Feb-10	10 - 15	Deep	30.2	2.2	<0.098	<4.3	<2.6
HS-04	25-Feb-10	25 - 35	Deep	33.6	1.1	<0.11	<4.3	<2.6
HS-05	24-Feb-10	25 - 34	Deep	130	5.0	<0.12	<4.8	<2.9
HS-06	24-Feb-10	12 - 14	Deep	73.9	4.2	<0.10	<4.2	<2.5
HS-07	24-Feb-10	25 - 35	Deep	29.8	2.0	<0.095	<3.9	<2.3
HS-08	25-Feb-10	10 - 20	Deep	114	5.8	0.21	<4.2	<2.5
SB-3-4	17-Dec-08	14 - 15	Deep	8.6	0.58 J	<0.019	<1.4	<1.1
SB-3-5	18-Dec-08	10 - 15	Deep	260 J	13 J	0.03	<1.6	1.4
SB-4-2	18-Dec-08	12 - 14	Deep	410 J	14 J	0.083	<1.9	1.4
SB-4-3	17-Dec-08	22 - 24	Deep	260	13	0.074	1.6 J	0.98 J
SB-4-4	17-Dec-08	23 - 24.5	Deep	150	5.6	0.03	<1.5	<1.2
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	32.0	3.9	0.025	<5.5	0.16
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	197	8.9	0.37	<6.3	0.99

Notes and Abbreviations:**Bold** indicates a detection above the residential RSL.**Bold** and underlined indicates a detection above the industrial RSL.

A "<" indicates the compound was not detected at concentrations above the reporting limit. If italicized it displays the method detection limit instead of the reporting limit

J - indicates an estimated value
mg/kg - milligrams per kilogram

* - The full sample date is unknown since the original report could not be located. The summary provided in WALSH, 1997 for this 1991 sampling only provides the year.

RSL - USEPA Regional Screening Level

Table 5-2c
Other Metals Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Aluminum (mg/Kg)	Antimony (mg/Kg)	Beryllium (mg/Kg)	Calcium (mg/Kg)	Cobalt (mg/Kg)	Copper (mg/Kg)	Iron (mg/Kg)	Magnesium (mg/Kg)	Manganese (mg/Kg)	Nickel (mg/Kg)	Potassium (mg/Kg)	Sodium (mg/Kg)	Thallium (mg/Kg)	Vanadium (mg/Kg)	
Screening Criteria				Residential Soil RSL(mg/kg)	7700	3.1	16	--	2.3	310	5500	--	180	150	--	--	0.078	39
				Industrial Soil RSL(mg/kg)	110000	47	230	--	35	4700	82000	--	2600	2200	--	--	1.2	580
BB-38-22	07-May-03	0 - 0	Shallow	4570	2 J	<1	1950	2	13	7840	1160	242	4	1270	128	<5	15	
BB-BB-26	07-May-03	0 - 0	Shallow	1470	<11	<1	443	<10	1	3150	319	139	1	338	88	<5	4	
BB-38-25	25-Apr-03	0 - 0	Shallow	8850	2 J	<1	6950	4	25	13900	2750	268	6	2360	53	1	22	
BB-BB-27	30-Apr-03	0 - 0	Shallow	8500	3 J	<1	2010	5	23	12600	1990	369	7	2330	20	2	20	
BB-CT-40	21-May-03	0 - 0	Shallow	3240	<12	<1	4510	2	5	6360	1070	127	3	942	116	<5	11	
TH-18	31-Mar-11	0.58 - 0.58	Shallow	--	--	--	--	--	12.0	8690	--	226	--	--	--	--	--	
BB-CT-38	21-May-03	4 - 4	Subsurface	1340	<12	<1	656	4	5	6700	386	56	2	307	218	<5	14	
TH-1	1991*	Unknown	Subsurface	--	--	<0.5	--	<2	4	2200	--	100	<2	--	--	--	3	
TH-2	1991*	Unknown	Subsurface	--	--	<3	--	25	1100	140000	--	12000	<10	--	--	--	71	
TH-3	1991*	Unknown	Subsurface	--	--	0.6	--	6	39	13000	--	240	7	--	--	--	18	
TH-4	1991*	Unknown	Subsurface	--	--	<0.5	--	3	6	3900	--	95	3	--	--	--	5	
TH-5	1991*	Unknown	Subsurface	--	--	<0.5	--	5	<2	7000	--	110	5	--	--	--	12	
TH-8	1991*	Unknown	Subsurface	--	--	<0.5	--	2	5	3400	--	150	3	--	--	--	5	
TH-9	1991*	Unknown	Subsurface	--	--	<0.5	--	2	5	4000	--	120	2	--	--	--	7	
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	--	--	--	--	--	7.4	10900	--	116	--	--	--	--	--	
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	--	--	--	--	--	72.2	17700	--	257	--	--	--	--	--	
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	--	--	--	--	--	5.9	3410	--	55.2	--	--	--	--	--	
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	--	--	--	--	--	33.0	17500	--	174	--	--	--	--	--	

Notes and Abbreviations:

- Bold** indicates a detection above the residential RSL.
- Bold** and underlined indicates a detection above the industrial RSL.
- A "<" indicates the compound was not detected at concentrations above the reporting limit. If italicized it displays the method detection limit instead of the reporting limit.
- J - indicates an estimated value
- mg/kg - milligrams per kilogram
- RSL - USEPA Reigonal Screening Level
- * - The full sample date is unknown since the original report could not be located.
- The summary provided in WALSH, 1997 for this 1991 sampling only provides the

Table 5-3
VOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	1,1-Dichloroethene (µg/Kg)	1,2,4-Trichlorobenzene (µg/Kg)	1,2,4-Trimethylbenzene (µg/Kg)	1,4-Dichlorobenzene (µg/Kg)	Acetone (µg/Kg)	Benzene (µg/Kg)	cis-1,2-Dichloroethylene (µg/Kg)	Ethylbenzene (µg/Kg)	Isopropyl benzene (Cumene) (µg/Kg)	m,p-Xylene (Sum of isomers) (µg/Kg)	
Screening Criteria				Residential Soil RSL (µg/kg)	23000	5800	30000	2600	6100000	1200	16000	5800	190000	--
				Industrial Soil RSL (µg/kg)	100000	26000	180000	11000	67000000	5100	230000	25000	990000	--
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	<390	--	--	<390	<1500	<77	<390	<150	--	--	
DC-3	30-May-97	0.5 - 20	Subsurface	--	--	--	--	--	<2	--	5.4	--	--	
HS-02	25-Feb-10	5 - 15	Subsurface	<31	--	--	<31	96.4	<6.2	<31	<31	--	--	
SB-3-2	17-Dec-08	4 - 9	Subsurface	0.71 J	<4.3	<4.3	<4.3	25 J	<4.3	<2.2	<4.3	<4.3	<2.2	
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	<320	--	--	<320	<1300	<64	<320	<130	--	--	
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	<320	--	--	176	<1300	<63	<320	163	--	--	
HS-01	24-Feb-10	15 - 25	Deep	<28	--	--	<28	<110	<5.7	<28	<28	--	--	
HS-03	25-Feb-10	10 - 15	Deep	<26	--	--	<26	<100	<5.2	<26	<26	--	--	
HS-04	25-Feb-10	25 - 35	Deep	<28	--	--	<28	<110	<5.6	<28	<28	--	--	
HS-05	24-Feb-10	25 - 34	Deep	<30	--	--	<30	<120	<6.0	<30	<30	--	--	
HS-06	24-Feb-10	12 - 14	Deep	<27	--	--	<27	<110	<5.4	<27	<27	--	--	
HS-07	24-Feb-10	25 - 35	Deep	<26	--	--	<26	<100	<5.1	<26	<26	--	--	
HS-08	25-Feb-10	10 - 20	Deep	<29	--	--	<29	102	<5.8	<29	<29	--	--	
SB-3-4	17-Dec-08	14 - 15	Deep	<5.5	<5.5	<5.5	<5.5	8.5 J	<5.5	<2.8	<5.5	<5.5	<3.9	
SB-3-5	18-Dec-08	10 - 15	Deep	<6.2	<6.2	1.1 J	<6.2	22 J	<6.2	<3.1	<6.2	<6.2	<4.3	
SB-4-2	18-Dec-08	12 - 14	Deep	<360	84 J	6400	<360	610 J	<360	<180	230 J	280 J	600	
SB-4-3	17-Dec-08	22 - 24	Deep	2.8 J	<11	<11	<11	23 J	<11	<5.5	<11	<11	<5.5	
SB-4-4	17-Dec-08	23 - 24.5	Deep	<6	<6	<6	<6	8.2 J	<6	<3	<6	<6	<4.2	
SWDI-1	09-Jul-15	10 - 12	Deep	<5.7	<5.7	--	2.2 J	41	<5.7	<2.9	1.1 J	1.1 J	1.4 J	
SWDI-2	09-Jul-15	10 - 12	Deep	<5.6	<5.6	--	<5.6	74	<5.6	<2.8	<5.6	<5.6	<2.8	
SWDI-3	08-Jul-15	15 - 17	Deep	<6.9	<6.9	--	<6.9	47	<6.9	<3.4	<6.9	<6.9	1.7 J	
SWDI-4	08-Jul-15	10 - 12	Deep	<6.4	<6.4	--	<6.4	70	<6.4	<3.2	<6.4	<6.4	2.4 J	
SWDI-5	08-Jul-15	10 - 12	Deep	<6.2	<6.2	--	<6.2	42	2.1 J	3.1	1.3 J	3.1 J	3.8	
SWDI-6	09-Jul-15	10 - 12	Deep	<5.4	<5.4	--	<5.4	77	0.6 J	5.2	<5.4	2.3 J	1.9 J	
SWDI-7	08-Jul-15	15 - 17	Deep	<6.6	<6.6	--	<6.6	14 J	<6.6	0.77 J	<6.6	<6.6	1.6 J	
SWDI-8	09-Jul-15	10 - 12	Deep	<5.9	<5.9	--	<5.9	78	0.77 J	<3	1.4 J	3.1 J	5.3	
SWDI-10	10-Jul-15	20 - 22	Deep	<5.9	<5.9	--	<5.9	49	<5.9	<3	<5.9	<5.9	<3	
SWDI-13	13-Jul-15	10 - 12	Deep	<4.9	<4.9	--	<4.9	<20	<4.9	<2.5	<4.9	<4.9	<2.5	
SWDI-15	13-Jul-15	15 - 17	Deep	<5.9	<5.9	--	<5.9	<24	<5.9	<3	<5.9	<5.9	<3	
SWDI-16	13-Jul-15	15 - 17	Deep	<6.5	<6.5	--	<6.5	<26	<6.5	<3.3	<6.5	<6.5	<3.3	
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	<300	--	--	<300	<1200	<59	<300	<120	--	--	
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	<350	--	--	<350	<1400	<71	<350	<140	--	--	

Table 5-3
VOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Methyl ethyl ketone (2-Butanone) (µg/Kg)	Methylene chloride (µg/Kg)	Naphthalene (µg/Kg)	n-Butylbenzene (µg/Kg)	n-Propylbenzene (µg/Kg)	o-Xylene (1,2-Dimethylbenzene) (µg/Kg)	p-Cymene (P-Isopropyltoluene) (µg/Kg)	sec-Butylbenzene (µg/Kg)	t-Butylbenzene (µg/Kg)	
Screening Criteria				Residential Soil RSL (µg/kg)	2700000	35000	3800	--	380000	65000	--	780000	780000
				Industrial Soil RSL (µg/kg)	19000000	320000	17000	--	2400000	280000	--	12000000	12000000
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	<1500	<390	--	--	--	--	--	--	--	
DC-3	30-May-97	0.5 - 20	Subsurface	--	--	--	--	--	--	--	--	--	
HS-02	25-Feb-10	5 - 15	Subsurface	<120	<31	--	--	--	--	--	--	--	
SB-3-2	17-Dec-08	4 - 9	Subsurface	4.9 J	<4.3	0.9 J	<4.3	<4.3	<2.2	<4.3	<4.3	<4.3	
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	<1300	<320	--	--	--	--	--	--	--	
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	<1300	<320	--	--	--	--	--	--	--	
HS-01	24-Feb-10	15 - 25	Deep	<110	<28	--	--	--	--	--	--	--	
HS-03	25-Feb-10	10 - 15	Deep	<100	<26	--	--	--	--	--	--	--	
HS-04	25-Feb-10	25 - 35	Deep	<110	<28	--	--	--	--	--	--	--	
HS-05	24-Feb-10	25 - 34	Deep	<120	<30	--	--	--	--	--	--	--	
HS-06	24-Feb-10	12 - 14	Deep	<110	<27	--	--	--	--	--	--	--	
HS-07	24-Feb-10	25 - 35	Deep	<100	<26	--	--	--	--	--	--	--	
HS-08	25-Feb-10	10 - 20	Deep	27.1	<29	--	--	--	--	--	--	--	
SB-3-4	17-Dec-08	14 - 15	Deep	<11	1.2 J	1.5 J	<5.5	<5.5	<2.8	<5.5	<5.5	<5.5	
SB-3-5	18-Dec-08	10 - 15	Deep	<12	<6.2	1.1 J	<6.2	<6.2	<3.1	<6.2	<6.2	<6.2	
SB-4-2	18-Dec-08	12 - 14	Deep	<720	<360	440 J	1200	680	560	1000	1100	94 J	
SB-4-3	17-Dec-08	22 - 24	Deep	<44	2.6 J	1.9 J	<11	<11	<5.5	<11	<11	<11	
SB-4-4	17-Dec-08	23 - 24.5	Deep	<12	1.7 J	0.78 J	<6	<6	<3	<6	<6	<6	
SWDI-1	09-Jul-15	10 - 12	Deep	<23	2.3 J	--	--	--	1.5 J	--	--	--	
SWDI-2	09-Jul-15	10 - 12	Deep	<22	<5.6	--	--	--	<2.8	--	--	--	
SWDI-3	08-Jul-15	15 - 17	Deep	13 J	2.4 J	--	--	--	<3.4	--	--	--	
SWDI-4	08-Jul-15	10 - 12	Deep	15 J	<6.4	--	--	--	1.1 J	--	--	--	
SWDI-5	08-Jul-15	10 - 12	Deep	<25	<6.2	--	--	--	2.9 J	--	--	--	
SWDI-6	09-Jul-15	10 - 12	Deep	<22	2.7 J	--	--	--	1.9 J	--	--	--	
SWDI-7	08-Jul-15	15 - 17	Deep	<26	<6.6	--	--	--	<3.3	--	--	--	
SWDI-8	09-Jul-15	10 - 12	Deep	<24	2.4 J	--	--	--	3.3	--	--	--	
SWDI-10	10-Jul-15	20 - 22	Deep	<24	4.7 J	--	--	--	<3	--	--	--	
SWDI-13	13-Jul-15	10 - 12	Deep	<20	1.9 J	--	--	--	<2.5	--	--	--	
SWDI-15	13-Jul-15	15 - 17	Deep	<24	3.6 J	--	--	--	<3	--	--	--	
SWDI-16	13-Jul-15	15 - 17	Deep	<26	<6.5	--	--	--	<3.3	--	--	--	
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	<1200	<300	--	--	--	--	--	--	--	
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	<1400	<350	--	--	--	--	--	--	--	

Table 5-3
VOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	PCE (µg/Kg)	Toluene (µg/Kg)	TCE (µg/Kg)	Xylenes, Total (µg/Kg)
Screening Criteria		Residential Soil RSL (µg/kg)		8100	490000	410	58000
		Industrial Soil RSL (µg/kg)		39000	4700000	1900	250000
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	<390	<150	<390	<150
DC-3	30-May-97	0.5 - 20	Subsurface	--	<2	--	5.9
HS-02	25-Feb-10	5 - 15	Subsurface	<31	<12	<31	<31
SB-3-2	17-Dec-08	4 - 9	Subsurface	<4.3	<4.3	<4.3	<4.3
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	<320	<130	<320	<130
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	<320	86.9	<320	483
HS-01	24-Feb-10	15 - 25	Deep	<28	<11	<28	<28
HS-03	25-Feb-10	10 - 15	Deep	<26	<10	<26	<26
HS-04	25-Feb-10	25 - 35	Deep	<28	<11	<28	<28
HS-05	24-Feb-10	25 - 34	Deep	<30	<12	<30	<30
HS-06	24-Feb-10	12 - 14	Deep	<27	<11	<27	<27
HS-07	24-Feb-10	25 - 35	Deep	<26	<10	<26	<26
HS-08	25-Feb-10	10 - 20	Deep	<29	<12	<29	<29
SB-3-4	17-Dec-08	14 - 15	Deep	<5.5	<5.5	<5.5	<3.9
SB-3-5	18-Dec-08	10 - 15	Deep	0.89 J	<6.2	<6.2	<4.3
SB-4-2	18-Dec-08	12 - 14	Deep	<360	<360	<360	1200
SB-4-3	17-Dec-08	22 - 24	Deep	<11	<11	<11	<11
SB-4-4	17-Dec-08	23 - 24.5	Deep	<6	<6	<6	<4.2
SWDI-1	09-Jul-15	10 - 12	Deep	<5.7	<5.7	<5.7	--
SWDI-2	09-Jul-15	10 - 12	Deep	<5.6	<5.6	<5.6	--
SWDI-3	08-Jul-15	15 - 17	Deep	<6.9	<6.9	<6.9	--
SWDI-4	08-Jul-15	10 - 12	Deep	<6.4	<6.4	<6.4	--
SWDI-5	08-Jul-15	10 - 12	Deep	<6.2	1.3 J	<6.2	--
SWDI-6	09-Jul-15	10 - 12	Deep	<5.4	<5.4	<5.4	--
SWDI-7	08-Jul-15	15 - 17	Deep	<6.6	<6.6	0.36 J	--
SWDI-8	09-Jul-15	10 - 12	Deep	<5.9	<5.9	<5.9	--
SWDI-10	10-Jul-15	20 - 22	Deep	<5.9	<5.9	<5.9	--
SWDI-13	13-Jul-15	10 - 12	Deep	<4.9	<4.9	<4.9	--
SWDI-15	13-Jul-15	15 - 17	Deep	<5.9	<5.9	<5.9	--
SWDI-16	13-Jul-15	15 - 17	Deep	<6.5	<6.5	<6.5	--
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	<300	<120	<300	<120
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	<350	<140	<350	<140

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit.
If italicized it displays the method detection limit instead of the reporting limit.
J - indicates an estimated value
(µg/kg) - micrograms per kilogram
RSL - USEPA Regional Screening Level

Table 5-4
SVOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	1-Methyl naphthalene (µg/Kg)	2-Methyl naphthalene (µg/Kg)	4-Methylphenol (p-Cresol) (µg/Kg)	Acenaphthene (µg/Kg)	Acenaphthylene (µg/Kg)	Anthracene (µg/Kg)	Benzo(a) anthracene (µg/Kg)	Benzo(a) pyrene (µg/Kg)	Benzo(b) fluoranthene (µg/Kg)	Benzo(g,h,i) perylene (µg/Kg)	Benzo(k) fluoranthene (µg/Kg)
Screening Criteria		Residential Soil RSL (µg/kg)		18000	24000	630000	360000	--	1800000	1100	110	1100	--	11000
		Industrial Soil RSL (µg/kg)		73000	300000	8200000	4500000	--	23000000	21000	2100	21000	--	210000
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	--	<2300	<2500	<2300	<2300	<2300	<2300	<2300	<2500	<2300	<3000
DC-1	30-May-97	0 - 20	Subsurface	--	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
DC-2	30-May-97	0.5 - 22	Subsurface	--	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
DC-3	30-May-97	0.5 - 20	Subsurface	--	60 J	80 J	100 J	<330	200 J	300 J	350	200 J	200 J	300 J
DC-4	02-Jun-97	1 - 17	Subsurface	--	200 J	<330	90 J	<330	200 J	300 J	340	350	300 J	300 J
DC-5	02-Jun-97	1 - 13.5	Subsurface	--	<330	<330	<330	60 J	200 J	510	640	550	440	490
DC-6	02-Jun-97	1 - 20	Subsurface	--	<330	<330	100 J	50 J	300 J	830	970	790	670	890
DC-7	02-Jun-97	1 - 17	Subsurface	--	<330	<330	<330	<330	6 J	20 J	<330	<330	<330	<330
DC-8	02-Jun-97	0 - 15	Subsurface	--	<330	<330	<330	<330	10 J	<330	<330	<330	<330	<330
HS-02	25-Feb-10	5 - 15	Subsurface	130	208	--	207	<410	274	698	625	599	395	495
SB-3-2	17-Dec-08	4 - 9	Subsurface	--	<380	<380	<380	<380	<380	<380	<380	<380	<380	<380
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	--	<420	<460	<420	<420	<420	<420	<420	<460	<420	<540
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	--	<2100	<2300	<2100	<2100	<2100	<2100	<2100	<2300	<2100	<2700
HS-01	24-Feb-10	15 - 25	Deep	<7.6	<38	--	<7.6	<38	<7.6	<7.6	5.4	6.4	<7.6	6.1
HS-03	25-Feb-10	10 - 15	Deep	<6.9	<34	--	<6.9	<34	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9
HS-04	25-Feb-10	25 - 35	Deep	<7.4	<37	--	<7.4	<37	<7.4	<7.4	<7.4	<7.4	<7.4	<7.4
HS-05	24-Feb-10	25 - 34	Deep	<8.0	<40	--	<8.0	<40	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0
HS-06	24-Feb-10	12 - 14	Deep	<7.1	<36	--	<7.1	<36	7.5	44.1	42.3	43.1	25.9	39.2
HS-07	24-Feb-10	25 - 35	Deep	<6.8	<34	--	<6.8	<34	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
HS-08	25-Feb-10	10 - 20	Deep	242	317	--	388	<770	455	1450	1650	1550	1030	1430
SB-3-4	17-Dec-08	14 - 15	Deep	--	<370	<370	<370	<370	<370	<370	<370	<370	<370	<370
SB-3-5	18-Dec-08	10 - 15	Deep	--	<410	<410	<410	<410	<410	<410	<410	<410	<410	<410
SB-4-2	18-Dec-08	12 - 14	Deep	--	680	<470	<470	<470	<470	<470	<470	<470	<470	<470
SB-4-3	17-Dec-08	22 - 24	Deep	--	<490	<490	<490	<490	<490	<490	<490	<490	<490	<490
SB-4-4	17-Dec-08	23 - 24.5	Deep	--	<390	<390	<390	<390	<390	<390	<390	<390	<390	<390
SWDI-1	09-Jul-15	10 - 12	Deep	<2000	<2000	--	<2000	<2000	160 J	330 J	310 J	350 J	180 J	<2000
SWDI-2	09-Jul-15	10 - 12	Deep	32 J	42 J	--	64 J	<370	47 J	59 J	65 J	84 J	48 J	<370
SWDI-3	08-Jul-15	15 - 17	Deep	28 J	29 J	--	45 J	<420	51 J	94 J	<420	130 J	40 J	<420
SWDI-4	08-Jul-15	10 - 12	Deep	25 J	30 J	--	22 J	25 J	43 J	130 J	<390	180 J	120 J	80 J
SWDI-5	08-Jul-15	10 - 12	Deep	<3800	<3800	--	<3800	<3800	<3800	<3800	<3800	<3800	<3800	<3800
SWDI-6	09-Jul-15	10 - 12	Deep	<1700	<1700	--	<1700	<1700	<1700	160 J	150 J	220 J	120 J	<1700
SWDI-7	08-Jul-15	15 - 17	Deep	15 J	<360	--	<360	<360	<360	<360	<360	<360	<360	<360
SWDI-8	09-Jul-15	10 - 12	Deep	64 J	78 J	--	36 J	26 J	65 J	140 J	140 J	250 J	140 J	79 J
SWDI-10	10-Jul-15	20 - 22	Deep	97 J	95 J	--	440	110 J	720	1600	1600	2100	1100	810
SWDI-13	13-Jul-15	10 - 12	Deep	<350	<350	--	<350	<350	<350	<350	<350	<350	<350	<350
SWDI-15	13-Jul-15	15 - 17	Deep	<1800	<1800	--	230 J	<1800	360 J	710 J	720 J	950 J	420 J	320 J
SWDI-16	13-Jul-15	15 - 17	Deep	<370	<370	--	<370	<370	26 J	53 J	51 J	61 J	19 J	<370
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	--	<40	<44	<40	<40	<40	<40	<40	<44	<40	<51
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	--	<890	<970	<890	<890	<890	<890	<890	<970	<890	<1100

Table 5-4
SVOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	bis(2-chloroisopropyl) Ether (µg/Kg)	bis(2-ethylhexyl) phthalate (µg/Kg)	Chrysene (µg/Kg)	Dibenz(a,h) anthracene (µg/Kg)	Dibenzofuran (µg/Kg)	Diethyl Phthalate (µg/Kg)	Di-n-butyl phthalate (µg/Kg)	Fluoranthene (µg/Kg)	Fluorene (µg/Kg)	Indeno(1,2,3-c,d) Pyrene (µg/Kg)	Naphthalene (µg/Kg)
Screening Criteria		Residential Soil RSL (µg/kg)		310000	39000	110000	110	7300	5100000	630000	240000	240000	1100	3800
		Industrial Soil RSL (µg/kg)		4700000	160000	2100000	2100	100000	66000000	8200000	3000000	3000000	21000	17000
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	--	<11000	<3000	<2500	<2300	<4400	<2300	<4400	<2500	<2300	<4400
DC-1	30-May-97	0 - 20	Subsurface	<330	<330	<330	<330	<330	<330	200 J	<330	<330	<330	<330
DC-2	30-May-97	0.5 - 22	Subsurface	<330	<330	<330	<330	<330	<330	<330	40 J	<330	<330	<330
DC-3	30-May-97	0.5 - 20	Subsurface	<330	<330	370	<330	60 J	<330	100 J	830	100 J	200 J	100 J
DC-4	02-Jun-97	1 - 17	Subsurface	<330	100 J	360	<330	40 J	<330	80 J	960	70 J	200 J	200 J
DC-5	02-Jun-97	1 - 13.5	Subsurface	<330	<330	590	<330	<330	<330	50 J	1100	50 J	<330	<330
DC-6	02-Jun-97	1 - 20	Subsurface	<330	<330	960	<330	60 J	<330	70 J	1900	80 J	580	40 J
DC-7	02-Jun-97	1 - 17	Subsurface	<330	<330	20 J	<330	<330	<330	<330	60	<330	<330	<330
DC-8	02-Jun-97	0 - 15	Subsurface	200 J	200 J	<330	<330	<330	<330	10 J	10 J	<330	<330	<330
HS-02	25-Feb-10	5 - 15	Subsurface	--	--	763	155	--	--	--	1490	224	358	517
SB-3-2	17-Dec-08	4 - 9	Subsurface	<380	<380	<380	<380	<380	<750	<380	<380	<380	<380	<380
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	--	<1900	<540	<460	<420	<800	<420	<800	<460	<420	<800
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	--	<9500	<2700	<2300	<2100	<4000	<2100	<4000	<2300	<2100	<4000
HS-01	24-Feb-10	15 - 25	Deep	--	--	8.2	<7.6	--	--	--	15.0	<7.6	<7.6	<38
HS-03	25-Feb-10	10 - 15	Deep	--	--	<6.9	<6.9	--	--	--	<6.9	<6.9	<6.9	<34
HS-04	25-Feb-10	25 - 35	Deep	--	--	<7.4	<7.4	--	--	--	<7.4	<7.4	<7.4	<37
HS-05	24-Feb-10	25 - 34	Deep	--	--	<8.0	<8.0	--	--	--	<8.0	<8.0	<8.0	<40
HS-06	24-Feb-10	12 - 14	Deep	--	--	52.4	5.4	--	--	--	100	<7.1	23.0	<36
HS-07	24-Feb-10	25 - 35	Deep	--	--	<6.8	<6.8	--	--	--	<6.8	<6.8	<6.8	<34
HS-08	25-Feb-10	10 - 20	Deep	--	--	1500	267	--	--	--	2560	391	936	869
SB-3-4	17-Dec-08	14 - 15	Deep	<370	<370	<370	<370	<370	<730	<370	<370	<370	<370	<370
SB-3-5	18-Dec-08	10 - 15	Deep	<410	<410	<410	<410	<410	<810	<410	<410	<410	<410	<410
SB-4-2	18-Dec-08	12 - 14	Deep	<470	<470	<470	<470	<470	<940	<470	300 J	250 J	<470	770
SB-4-3	17-Dec-08	22 - 24	Deep	<490	<490	<490	<490	<490	<990	<490	<490	<490	<490	<490
SB-4-4	17-Dec-08	23 - 24.5	Deep	<390	<390	<390	<390	<390	<790	<390	<390	<390	<390	<390
SWDI-1	09-Jul-15	10 - 12	Deep	--	--	380 J	<2000	--	--	--	620 J	<2000	140 J	<2000
SWDI-2	09-Jul-15	10 - 12	Deep	--	--	84 J	<370	--	--	--	140 J	66 J	41 J	89 J
SWDI-3	08-Jul-15	15 - 17	Deep	--	--	110 J	<420	--	--	--	190 J	48 J	61 J	<420
SWDI-4	08-Jul-15	10 - 12	Deep	--	--	170 J	<390	--	--	--	210 J	29 J	99 J	<390
SWDI-5	08-Jul-15	10 - 12	Deep	--	--	<3800	<3800	--	--	--	<3800	<3800	<3800	<3800
SWDI-6	09-Jul-15	10 - 12	Deep	--	--	290 J	<1700	--	--	--	380 J	<1700	<1700	<1700
SWDI-7	08-Jul-15	15 - 17	Deep	--	--	<360	<360	--	--	--	<360	<360	<360	<360
SWDI-8	09-Jul-15	10 - 12	Deep	--	--	250 J	<350	--	--	--	380	38 J	120 J	140 J
SWDI-10	10-Jul-15	20 - 22	Deep	--	--	1800	260 J	--	--	--	3500	430	1100	200 J
SWDI-13	13-Jul-15	10 - 12	Deep	--	--	<350	<350	--	--	--	<350	<350	<350	<350
SWDI-15	13-Jul-15	15 - 17	Deep	--	--	770 J	130 J	--	--	--	1600 J	280 J	400 J	<1800
SWDI-16	13-Jul-15	15 - 17	Deep	--	--	57 J	<370	--	--	--	110 J	<370	26 J	<370
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	--	<180	<51	<44	<40	<77	<40	<77	<44	<40	<77
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	--	<4000	<1100	<970	<890	<1700	<890	<1700	<970	<890	<1700

Table 5-4
SVOC Soil Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	Nitrobenzene (µg/Kg)	Phenanthrene (µg/Kg)	Pyrene (µg/Kg)
Screening Criteria		Residential Soil RSL (µg/kg)		5100	--	180000
		Industrial Soil RSL (µg/kg)		22000	--	2300000
CTL MW-05 (TH-18)	31-Mar-11	0.58 - 0.58	Shallow	<11000	<4400	<2500
DC-1	30-May-97	0 - 20	Subsurface	<330	<330	<330
DC-2	30-May-97	0.5 - 22	Subsurface	<330	<330	30 J
DC-3	30-May-97	0.5 - 20	Subsurface	<330	690	700
DC-4	02-Jun-97	1 - 17	Subsurface	<330	730	750
DC-5	02-Jun-97	1 - 13.5	Subsurface	<330	670	1100
DC-6	02-Jun-97	1 - 20	Subsurface	20 J	1500	2000
DC-7	02-Jun-97	1 - 17	Subsurface	<330	30	70
DC-8	02-Jun-97	0 - 15	Subsurface	10 J	10 J	20 J
HS-02	25-Feb-10	5 - 15	Subsurface	--	1410	1700
SB-3-2	17-Dec-08	4 - 9	Subsurface	<380	<380	<380
CTL MW-02 (TH-14)	31-Mar-11	5 - 7	Subsurface	<1900	<800	<460
CTL MW-04 (TH-17)	31-Mar-11	5 - 5	Subsurface	<9500	<4000	<2300
HS-01	24-Feb-10	15 - 25	Deep	--	11.1	12.8
HS-03	25-Feb-10	10 - 15	Deep	--	<6.9	<6.9
HS-04	25-Feb-10	25 - 35	Deep	--	<7.4	<7.4
HS-05	24-Feb-10	25 - 34	Deep	--	<8.0	<8.0
HS-06	24-Feb-10	12 - 14	Deep	--	43.2	111
HS-07	24-Feb-10	25 - 35	Deep	--	<6.8	<6.8
HS-08	25-Feb-10	10 - 20	Deep	--	1940	3510
SB-3-4	17-Dec-08	14 - 15	Deep	<370	<370	<370
SB-3-5	18-Dec-08	10 - 15	Deep	<410	<410	15 J
SB-4-2	18-Dec-08	12 - 14	Deep	<470	440 J	180 J
SB-4-3	17-Dec-08	22 - 24	Deep	<490	<490	27 J
SB-4-4	17-Dec-08	23 - 24.5	Deep	<390	<390	<390
SWDI-1	09-Jul-15	10 - 12	Deep	--	640 J	710 J
SWDI-2	09-Jul-15	10 - 12	Deep	--	230 J	160 J
SWDI-3	08-Jul-15	15 - 17	Deep	--	170 J	190 J
SWDI-4	08-Jul-15	10 - 12	Deep	--	120 J	230 J
SWDI-5	08-Jul-15	10 - 12	Deep	--	370 J	380 J
SWDI-6	09-Jul-15	10 - 12	Deep	--	390 J	410 J
SWDI-7	08-Jul-15	15 - 17	Deep	--	<360	13 J
SWDI-8	09-Jul-15	10 - 12	Deep	--	330 J	420
SWDI-10	10-Jul-15	20 - 22	Deep	--	3000	3700
SWDI-13	13-Jul-15	10 - 12	Deep	--	34 J	37 J
SWDI-15	13-Jul-15	15 - 17	Deep	--	1200 J	1800
SWDI-16	13-Jul-15	15 - 17	Deep	--	110 J	120 J
CTL MW-01 (TH-13)	30-Mar-11	10 - 12	Deep	<180	<77	<44
CTL MW-06 (TH-19)	31-Mar-11	22 - 25	Deep	<4000	<1700	<970

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit.
If italicized it displays the method detection limit instead of the reporting limit.
J - indicates an estimated value
(µg/kg) - micrograms per kilogram
RSL - USEPA Regional Screening Level

Table 5-5

TPH Soil Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Depth (feet bgs)	Depth Category	TPH as diesel fuel (mg/Kg)	TPH as gasoline (mg/Kg)
DC-1	30-May-97	0 - 20	Subsurface	<20	--
DC-2	30-May-97	0.5 - 22	Subsurface	<20	--
DC-3	30-May-97	0.5 - 20	Subsurface	110	--
DC-4	02-Jun-97	1 - 17	Subsurface	1400	--
DC-5	02-Jun-97	1 - 13.5	Subsurface	45	--
DC-6	02-Jun-97	1 - 20	Subsurface	50	--
DC-7	02-Jun-97	1 - 17	Subsurface	31	--
DC-8	02-Jun-97	0 - 15	Subsurface	24	--
HS-02	25-Feb-10	5 - 15	Subsurface	248	<1.2
HS-03	25-Feb-10	10 - 15	Deep	269	<1.0
HS-08	25-Feb-10	10 - 20	Deep	219	<1.2

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit.

J - indicates an estimated value

mg/kg - milligrams per kilogram

TPH - total petroleum hydrocarbons

Table 5-6

PCB Soils Data

VB/I-70 Superfund Site, OU2

Location Identification	HS-02	HS-03	HS-08
Field Sample Identification	HS-02	HS-03	HS-08
Date Collected	2/25/2010	2/25/2010	2/25/2010
Depth (feet)	5 - 15	10 - 15	10 - 20
Analyte (Units)			
Polychlorinated Biphenyls (PCBs) (µg/kg)			
Pcb, Total	<100	<17	<96
PCB-1016 (Arochlor 1016)	<100	<17	<96
PCB-1221 (Arochlor 1221)	<100	<17	<96
PCB-1232 (Arochlor 1232)	<100	<17	<96
PCB-1242 (Arochlor 1242)	<100	<17	<96
PCB-1248 (Arochlor 1248)	<100	<17	<96
PCB-1254 (Arochlor 1254)	<100	<17	<96
PCB-1260 (Arochlor 1260)	<100	<17	<96

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit.

The reporting limit is provided after for reference.

PCB - Polychlorinated Biphenyls

µg/kg - micrograms per kilogram

Table 5-7
Pesticide Soils Data
VB/I-70 Superfund Site, OU2

Location Identification Date Collected Depth (feet)	HS-02 2/25/2010 5 - 15	HS-03 2/25/2010 10 - 15	HS-08 2/25/2010 10 - 20	Residential RSL	Industrial RSL
Analyte (Units)					
Pesticides (µg/kg)					
Aldrin	<4.1	<0.69	<3.8	39	180
alpha BHC (alpha Hexachlorocyclohexane)	<4.1	<0.69	<3.8	86	360
alpha Endosulfan	<4.1	<0.69	<3.8	--	--
alpha-Chlordane	<4.1	<0.69	<3.8	--	--
beta BHC (beta Hexachlorocyclohexane)	<4.1	<0.69	<3.8	300	1300
beta Endosulfan	<4.1	<0.69	<3.8	--	--
Chlordane	<100	<17	<96	--	--
delta BHC (delta Hexachlorocyclohexane)	<4.1	<0.69	<3.8	--	--
Dieldrin	<4.1	<0.69	<3.8	34	140
Endosulfan sulfate	<12	<2.1	<12	--	--
Endrin	<4.1	<0.69	<3.8	1900	25000
Endrin aldehyde	<4.1	<0.69	<3.8	--	--
Endrin ketone	<4.1	<0.69	<3.8	--	--
gamma BHC (Lindane)	<4.1	<0.69	<3.8	570	2500
gamma-Chlordane	<4.1	<0.69	7.8	--	--
Heptachlor	<4.1	<0.69	<3.8	130	630
Heptachlor epoxide	<41	<0.69	<38	70	330
Methoxychlor	<25	<2.1	<23	32000	410000
p,p'-DDD	10.1	<0.69	30.8	190.00	2500.0
p,p'-DDE	<4.1	<0.69	9	2000	9300.0
p,p'-DDT	<8.3	<0.69	<7.7	1900	8500
Toxaphene	<210	<34	<190	--	--

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit. The reporting limit is provided after for reference.

(µg/kg) - micrograms per kilogram

RSL - USEPA Regional Screening Level

Table 5-8
Historical Dissolved Metal Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Calcium (µg/L)	Chromium Total (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (µg/L)	Manganese (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
Screening Criteria	CO Reg 41 GSL (µg/L)	5000	6	10	2000	4	5	--	100	50	50	300	50	--	50	2	100	50	50	2	100	5000
DC-2	05-Jun-97	--	--	10	94	--	1	--	0.9 J	--	--	--	<1	--	--	0.45	--	43	<1	--	--	--
DC-3	05-Jun-97	--	--	42	670	--	5	--	2.2	--	--	--	5.9	--	--	5.8	--	59	<1	--	--	--
DC-4	05-Jun-97	--	--	27	510	--	1	--	2.2	--	--	--	3.1	--	--	0.39	--	68	<1	--	--	--
MW-01	02-Nov-05	--	--	2.3 J	--	--	0.25 J	--	--	--	3.7	--	<1 J	--	--	--	--	--	--	--	--	13 J
MW-01	24-Jan-06	--	--	2 J	--	--	0.23 J	--	--	--	2.9	--	<1	--	--	--	--	--	--	--	--	12
MW-01	12-Apr-06	--	--	2.3 J	--	--	0.2 J	--	--	--	3.1	--	<1	--	--	--	--	--	--	--	--	14 J
MW-01	12-Jul-06	--	--	2 J	--	--	0.2 J	--	--	--	2.7	--	<1	--	--	--	--	--	--	--	--	13
MW-02	18-Aug-05	<100	8.6 J	63	970	<5	<5	130000	<10	--	<10	28 J	<3	73000	1200	<0.2	<40	<15	<10	<10	--	14 J
MW-02	02-Nov-05	--	--	150	--	--	.066 J	--	--	--	1.1 J	--	2.6 J	--	--	--	--	--	--	--	--	140 J
MW-02	24-Jan-06	--	--	120	--	--	.088 J	--	--	--	<2	--	2.1	--	--	--	--	--	--	--	--	150
MW-02	12-Apr-06	--	--	100	--	--	0.14 J	--	--	--	<2	--	1.9 J	--	--	--	--	--	--	--	--	140 J
MW-02	12-Jul-06	--	--	120	--	--	0.071 J	--	--	--	7.6	--	1.6	--	--	--	--	--	--	--	--	150
MW-03	18-Aug-05	<100	<10	22	760	<5	<1	150000	0.93 J	--	<10	21000	<3	52000	500	<0.2	3.5 J	<5	<100	<10	--	12
MW-03	02-Nov-05	--	--	9.8	--	--	<1	--	--	--	<2	--	.41 J	--	--	--	--	--	--	--	--	32 J
MW-03	24-Jan-06	--	--	6.6	--	--	<1	--	--	--	<2	--	.28 J	--	--	--	--	--	--	--	--	28
MW-03	12-Apr-06	--	--	9.5	--	--	<1	--	--	--	<2	--	.11 J	--	--	--	--	--	--	--	--	40 J
MW-03	12-Jul-06	--	--	7.1	--	--	<1	--	--	--	<2	--	<1	--	--	--	--	--	--	--	--	30
MW-05	02-Nov-05	--	--	1.5 J	--	--	<1	--	--	--	2.1	--	.2 J	--	--	--	--	--	--	--	--	5.4 J
MW-05	24-Jan-06	--	--	1.5 J	--	--	<1	--	--	--	2.4	--	<1	--	--	--	--	--	--	--	--	4.4 J
MW-05	12-Apr-06	--	--	1.5 J	--	--	<1	--	--	--	2.6	--	<1	--	--	--	--	--	--	--	--	5.8 J
MW-05	12-Jul-06	--	--	1.5 J	--	--	<1	--	--	--	3.1	--	.44 J	--	--	--	--	--	--	--	--	8.2 J
MW-06	02-Nov-05	--	--	1.2 J	--	--	0.05 J	--	--	--	2.8	--	.16 J	--	--	--	--	--	--	--	--	5.7 J
MW-06	24-Jan-06	--	--	1.3 J	--	--	<1	--	--	--	2	--	<1	--	--	--	--	--	--	--	--	4.2 J
MW-06	12-Apr-06	--	--	1.6 J	--	--	<1	--	--	--	1.8 J	--	.18 J	--	--	--	--	--	--	--	--	6 J
MW-06	12-Jul-06	--	--	3.6 J	--	--	0.11 J	--	--	--	14	--	6	--	--	--	--	--	--	--	--	37
QUAD-1	25-May-01	--	--	1.1 J	--	--	<1.0	--	1.5 J	--	13.9	<100	0.34 J	--	1.7	--	3.1	2.8 J	<1.0	--	--	82.1
QUAD-2	25-May-01	--	--	1.3 J	--	--	0.32 J	--	1.9 J	--	8.3	<100	0.24 J	--	0.19 J	--	2.8	3.1 J	0.97 J	--	--	40.7
QUAD-3	25-May-01	--	--	2.1 J	--	--	0.78 J	--	2.4	--	8.9	<100	0.48 J	--	0.16 J	--	3.7	4.4 J	0.31 J	--	--	33.6
QUAD-4	25-May-01	--	--	2.3 J	--	--	0.18 J	--	2.3	--	8.7	<100	0.53 J	--	0.18 J	--	3.5	4.4 J	0.15 J	--	--	46.8
TH-1	26-May-98	--	--	<2	50	<5	<10	--	<20	<20	<20	<20	<2	--	60	<.4	<20	<2	<10	--	<20	<20
TH-2	01-Jan-91	--	--	<8	90	<5	<10	--	<20	<20	<20	<20	<2	--	500	<.4	<20	<8	<10	--	<20	20
TH-3	01-Jan-91	--	--	<8	260	<5	<10	--	<20	<20	<20	<20	<2	--	1400	<.4	<20	<2	<10	--	<20	<20
TH-4	01-Jan-91	--	--	<2	130	<5	<10	--	<20	<20	<20	<20	<2	--	1100	<.4	<20	<2	<10	--	<20	110
TH-5	01-Jan-91	--	--	<4	270	<5	<10	--	<20	<20	<20	360	<2	--	1500	<.4	<20	<2	<10	--	<20	30
TH-8	01-Jan-91	--	--	<2	50	<5	<10	--	<20	<20	<20	<20	<2	--	20	<.4	<20	<4	<10	--	<20	<20
TH-9	01-Jan-91	--	--	<2	60	<5	<10	--	<20	<20	<20	<20	<2	--	<10	<.4	<20	<8	<10	--	<20	<20

Notes and Abbreviations:
A "<" indicates the compound was not detected at concentrations above the reporting limit.
If italicized it displays the method detection limit instead of the reporting limit.
Bold indicates a detection above the GSL
J - indicates an estimated value
µg/L - micrograms per liter
GSL - groundwater screening level

Table 5-9
Recent Dissolved Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Calcium (µg/L)	Chromium III (µg/L)	Chromium, Hexavalent (µg/L)	Chromium, Total (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (µg/L)	Manganese (µg/L)	Mercury (µg/L)
Screening Criteria	CO Reg 41 GSL (µg/L)	5000	6	10	2000	4	5	--	--	--	100	50	50	300	50	--	50	2
CTL MW-01	05-Apr-11	--	--	<5.9	54.5	--	<0.62	--	--	<10	1.0 J	--	--	17.9 J	1.8U	--	26.5	0.022 J
CTL MW-01	30-Jan-14	2.3 J	0.68 J	0.81 J	65.2	1	1	177000 J	--	--	0.78 J	0.16 J	1.4 J	80.7 J	1	27400	0.73 J	0.2
CTL MW-02	05-Apr-11	--	--	7.2 J	113	--	<0.62	--	--	<10	1.1 J	--	--	27.3 J	1.8U	--	2.2 J	0.041 J
CTL MW-02	30-Jan-14	67.7 J	<2 J	0.72 J	140 J	<1 J	<1 J	179000 J	--	--	1.2 J	0.24 J	1.6 J	174 J	<1 J	30600 J	32.9 J	<0.2 J
CTL MW-03	05-Apr-11	--	--	5.9 J	49.4	--	264	--	--	<10	1.3 J	--	--	12.5 J	1.8U	--	92.7	0.18
CTL MW-04	05-Apr-11	--	--	15.5 J	121	--	1.9 J	--	--	<10	0.8 J	--	8.3	28.6 J	3.1 J	--	2140	<0.014
CTL MW-04	18-Feb-14	9 J	1.2 J	48.7 J	187 J	<1 J	<1 J	186000 J	--	--	1.1 J	11.3 J	4.2 J	6630 J	0.29 J	68000 J	2540 J	<0.2 J
CTL MW-05	05-Apr-11	--	--	7.6 J	548	--	0.90 J	--	--	<50	0.60 J	--	--	23300	11.7 J	--	775	<0.014
CTL MW-05	18-Feb-14	17.2 J	0.43 J	4.3 J	847 J	2 J	<1 J	192000 J	--	--	4 J	2.4 J	2.2 J	32400 J	0.87 J	67000 J	631 J	<0.2 J
CTL MW-06	05-Apr-11	--	--	11.7 J	591	--	<0.62	--	--	<10	1.7 J	--	--	1000	4.6 J	--	3370	0.030 J
CTL MW-06	30-Jan-14	4.6 J	0.76 J	11.5	718	1	1	139000	--	--	1.9 J	11.6	3	22100	0.31 J	71600	316	0.2
CTL MW-06	15-Jul-15	--	--	--	--	--	<1	--	<20	<20	--	--	<2	26 J	<1	--	350	--
HS-01	24-Feb-10	--	--	<25	113	--	<10	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-02	25-Feb-10	--	--	<25	93.7	--	<10	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-03	25-Feb-10	--	--	<25	56.5	--	18.2	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-04	25-Feb-10	--	--	<25	53.1	--	109	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-05	24-Feb-10	--	--	<25	55.5	--	<10	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-07	25-Feb-10	--	--	<25	61.5	--	<10	--	--	--	<10	--	--	--	<50	--	--	<0.10
HS-08	25-Feb-10	--	--	<25	309	--	<10	--	--	--	<10	--	--	--	<50	--	--	<0.10
MW-01	21-Mar-12	21.2 J	0.29 J	2.4 J	102 J	<1 J	0.55 J	160000 J	--	--	0.23 J	2.4 J	2.7 J	1070 J	0.055 J	31200 J	910 J	<0.2 J
MW-01	30-May-12	4.9 J	0.24 J	2.4	108	<1	0.47 J	155000 J	--	--	0.31 J	1.8	3.6	556	0.66 J	30100	608	0.099 J
MW-01	06-Sep-12	48.1 J	0.16 J	2.1 J	86.6 J	<1	1.1 J	133000 J	--	--	0.54 J	0.69 J	4.3 J	643 J	0.57 J	25700 J	182 J	<0.2
MW-01	04-Dec-12	4.3 J	0.2 J	2.5	102	<1	0.56 J	169000 J	--	--	<2	0.81 J	2.7	11.6 J	0.11 J	31900	595 J	<0.2
MW-01	11-Feb-14	2030 J	109 J	1.9 J	106 J	49.5 J	0.42 J	174000 J	--	--	<2 J	0.85 J	2.9 J	110 J	<1 J	31600 J	841 J	<0.2 J
MW-02	21-Mar-12	<20 J	3.7 J	99.7 J	885 J	<1 J	<1 J	141000 J	--	--	0.33 J	2.2 J	3.2 J	9130 J	0.28 J	81600 J	1180 J	<0.2 J
MW-02	30-May-12	6 J	4.8	125	987	<1	0.18 J	132000 J	--	--	0.32 J	2.5	1 J	9240	0.62 J	82300	1210	0.087 J
MW-02	06-Sep-12	34.7 J	6.2	95.3 J	882 J	<1	0.17 J	114000 J	--	--	1.2 J	2.2 J	1.3 J	5780 J	4.3 J	68500 J	966 J	<0.2
MW-02	04-Dec-12	2.2 J	6.7	141	1020	<1	<1	145000 J	--	--	0.65 J	2.3 J	0.66 J	8420	0.45 J	85800	1190 J	<0.2
MW-02	11-Feb-14	7.3 J	4.9 J	117 J	952 J	<1 J	0.38 J	139000 J	--	--	1.1 J	2.2 J	1.5 J	8640 J	0.67 J	82000 J	1070 J	<0.2 J
MW-03	22-Mar-12	6.4 J	0.087 J	2.5 J	500 J	<1 J	<1 J	165000 J	--	--	0.91 J	2.2 J	0.68 J	21200 J	0.13 J	50200 J	502 J	<0.2 J
MW-03	31-May-12	5.7 J	0.11 J	2.6	529	<1	0.17 J	159000 J	--	--	0.94 J	2.4	0.94 J	21900	0.083 J	49100	518	0.083 J
MW-03	06-Sep-12	145 J	0.21 J	3.6 J	492 J	<1	0.84 J	145000 J	--	--	2.2	2.5 J	3.7 J	20400 J	18.4 J	43000 J	461 J	<0.2
MW-03	05-Dec-12	10 J	0.099 J	3.2	584	<1	<1	157000 J	--	--	1.1 J	2.5 J	0.82 J	20700	0.53 J	53300	484 J	<0.2
MW-03	18-Feb-14	6.3 J	0.49 J	3.3 J	554 J	<1 J	0.86 J	165000 J	--	--	0.69 J	2.2 J	1.2 J	19600 J	8.4 J	49600 J	458 J	<0.2 J
MW-05	20-Mar-12	<20 J	0.14 J	0.94 J	60.1	0.037 J	0.022 J	162000 J	--	--	1 J	0.35 J	0.99 J	1050 J	0.012 J	36800	0.13 J	<0.2
MW-05	29-May-12	21.9	0.13 J	0.88 J	65.1	<1 J	0.08 J	155000 J	--	--	1.3 J	0.24 J	1.4 J	553	0.16 J	35600	0.57 J	0.12 J
MW-05	05-Sep-12	47 J	0.19 J	0.96 J	57.3 J	<1	1 J	134000 J	--	--	1.3 J	0.27 J	1.5 J	605 J	0.34 J	33100 J	5.3 J	<0.2
MW-05	03-Dec-12	7.1 J	0.11 J	0.58 J	63.1	<1	<1	166000 J	--	--	0.81 J	0.18 J	0.93 J	22.3 J	<1	39400	<1	<0.2
MW-05	29-Jan-14	554 J	110 J	40.8 J	61.9 J	45.6 J	51.5 J	172000 J	--	--	189 J	463 J	218 J	447 J	20.6 J	35400 J	472 J	0.98 J
MW-06	26-Feb-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.1
MW-06	20-Mar-12	8.2 J	0.13 J	1	53.3	<1	<1	169000 J	--	--	1.3 J	0.34 J	1.1 J	1140 J	<1	30400	0.83 J	<0.2
MW-06	29-May-12	7.8 J	0.085 J	1.2	62.9	<1	<1	167000 J	--	--	1.6 J	0.27 J	1.7 J	609	1.2	31400	1.5	0.1 J
MW-06	04-Sep-12	6.3 J	<2	0.97 J	47.6 J	<1	1 J	133000 J	--	--	1.4 J	0.21 J	1.3 J	560 J	0.22 J	24500 J	2.5 J	<0.2
MW-06	03-Dec-12	130	0.099 J	0.68 J	55.6	<1	<1	166000 J	--	--	0.94 J	0.19 J	2.4	98.6 J	0.079 J	30500	2.4	<0.2
MW-06	29-Jan-14	3.3 J	0.37 J	0.53 J	57.4 J	<1 J	<1 J	174000 J	--	--	1.4 J	0.18 J	1.8 J	<200 J	<1 J	28600 J	28.8 J	<0.2 J
PW-2 MIDDLE	06-Jul-16	--	--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--
PW-2 START	05-Jul-16	--	--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--
SWDI-1	13-Jul-15	--	--	--	--	--	6.9	--	<20	<40	--	--	3.1	210	2.3	--	860	--

Table 5-9
Recent Dissolved Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Calcium (µg/L)	Chromium III (µg/L)	Chromium, Hexavalent (µg/L)	Chromium, Total (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (µg/L)	Manganese (µg/L)	Mercury (µg/L)
Screening Criteria	CO Reg 41 GSL (µg/L)	5000	6	10	2000	4	5	--	--	--	100	50	50	300	50	--	50	2
SWDI-2	13-Jul-15	--	--	--	--	--	0.59 J	--	<20	<20	--	--	0.87 J	160	1.7	--	3300	--
SWDI-3	13-Jul-15	--	--	--	--	--	<1	--	55	5.9 J	--	--	0.97 J	4300	2.2	--	2800	--
SWDI-4	14-Jul-15	--	--	--	--	--	<1	--	<20	<20	--	--	<2	<100	2.0	--	3800	--
SWDI-5	13-Jul-15	--	--	--	--	--	<1	--	22 J	<40 J	--	--	<2	28 J	3.1	--	3100	--
SWDI-6	14-Jul-15	--	--	--	--	--	<1	--	<20	<20	--	--	0.67 J	12000	3.0	--	1200	--
SWDI-7	14-Jul-15	--	--	--	--	--	<1	--	<20 J	<20 J	--	--	<2	61 J	0.20 J	--	1800	--
SWDI-8	14-Jul-15	--	--	--	--	--	<1	--	47 J	<20 J	--	--	<2	31 J	0.29 J	--	4200	--
SWDI-10	14-Jul-15	--	--	--	--	--	<1	--	32	<20	--	--	0.62 J	3300	1.6	--	6000	--
SWDI-12	14-Jul-15	--	--	--	--	--	<1	--	37	<20	--	--	3.4 J	480	22	--	740	--
SWDI-13	15-Jul-15	--	--	--	--	--	1.2	--	86	<20	--	--	2.6	<100	<1	--	1700	--
SWDI-14	15-Jul-15	--	--	--	--	--	<1	--	35	<20	--	--	0.86 J	<100	<1	--	750	--
SWDI-15	14-Jul-15	--	--	--	--	--	1.5	--	72	<20	--	--	3.8 J	4000	6.5	--	790	--
SWDI-16	15-Jul-15	--	--	--	--	--	0.69 J	--	210	<20	--	--	4.4	68 J	<1	--	550	--
TH-45	19-Jan-16	--	--	--	--	--	0.27	--	20	4	--	--	0.56	22	0.18	--	98	--
TH-46	19-Jan-16	--	--	--	--	--	0.43 J	--	20	4	--	--	--	22	--	--	--	--
TH-47	19-Jan-16	--	--	--	--	--	0.86 J	--	20	4	--	--	0.79 J	22	0.18	--	370	--
TH-47D	19-Jan-16	--	--	--	--	--	0.58 J	--	20	4	--	--	0.56	22	0.18	--	380	--
TH-48	19-Jan-16	--	--	--	--	--	0.27 J	--	20	4	--	--	2.2	22	0.2 J	--	120	--
TH-52	19-Jan-16	--	--	--	--	--	0.35 J	--	20	5.4 J	--	--	0.56	22	--	--	--	--

Table 5-9
Recent Dissolved Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Nickel (µg/L)	Potassium (µg/L)	Selenium (µg/L)	Silver (µg/L)	Sodium (µg/L)	Thallium (µg/L)	Uranium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
Screening Criteria	CO Reg 41 GSL (µg/L)	100	--	50	50	--	2	30	100	5000
CTL MW-01	05-Apr-11	--	--	<5.7	<0.56	--	--	--	--	1.4 J
CTL MW-01	30-Jan-14	0.59 J	5980	4.5 J	1	145000	1	--	2.1 J	1.2 J
CTL MW-02	05-Apr-11	--	--	5.9 J	<0.56	--	--	--	--	<1.4
CTL MW-02	30-Jan-14	1.7 J	5450 J	3.8 J	<1 J	139000 J	<1 J	--	2 J	2
CTL MW-03	05-Apr-11	--	--	<5.7	<0.56	--	--	--	--	31.5
CTL MW-04	05-Apr-11	--	--	<5.7	<0.56	--	--	--	--	121
CTL MW-04	18-Feb-14	38.2 J	7960 J	5.2 J	<1 J	640000 J	<1 J	--	2.5 J	31.3 J
CTL MW-05	05-Apr-11	--	--	<5.7	<0.56	--	--	--	--	53.3
CTL MW-05	18-Feb-14	1.5 J	96300 J	1.9 J	<1 J	344000 J	<1 J	--	10 J	3.7 J
CTL MW-06	05-Apr-11	--	--	5.7 J	<0.56	--	--	--	--	10.6 J
CTL MW-06	30-Jan-14	6	52400	17.8	1	498000 J	1	--	5	7.6
CTL MW-06	15-Jul-15	3.0	--	1.1 J	<5	--	--	--	--	4.0 J
HS-01	24-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-02	25-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-03	25-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-04	25-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-05	24-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-07	25-Feb-10	--	--	<50	<30	--	--	--	--	--
HS-08	25-Feb-10	--	--	<50	<30	--	--	--	--	--
MW-01	21-Mar-12	5.8 J	11100 J	5.3 J	<1 J	166000 J	<1 J	--	2.2 J	5.4 J
MW-01	30-May-12	4.8	11100	5.3	<1	172000 J	<1	--	2.4 J	67 J
MW-01	06-Sep-12	5.1 J	9970 J	5.4 J	<1	142000 J	<1	--	2.2 J	11.1 J
MW-01	04-Dec-12	4.5	11300	4.2 J	1 J	166000 J	0.022 J	--	2.6 J	5.6
MW-01	11-Feb-14	450 J	10900 J	4.2 J	<1 J	174000 J	52.5 J	--	514 J	466 J
MW-02	21-Mar-12	2.8 J	61600 J	2.9 J	<1 J	169000 J	<1 J	--	<5 J	76.4 J
MW-02	30-May-12	2.5	66500 J	1.9 J	<1	169000 J	<1	--	0.33 J	129 J
MW-02	06-Sep-12	3.6 J	64800 J	1.6 J	0.038 J	152000 J	0.05 J	--	1.1 J	88.4 J
MW-02	04-Dec-12	1.9	75900	<5	1 J	172000 J	<1	--	<5	107
MW-02	11-Feb-14	1.8 J	64400 J	1.4 J	<1 J	182000 J	<1 J	--	<5 J	98.8 J
MW-03	22-Mar-12	3.4 J	67600 J	2.7 J	<1 J	195000 J	<1 J	--	<5 J	1.9 J
MW-03	31-May-12	2.2	70200 J	1.9 J	<1	196000 J	<1	--	0.53 J	13.9 J
MW-03	06-Sep-12	3.8 J	69900 J	2.2 J	0.032 J	186000 J	<1	--	1.4 J	27.7 J
MW-03	05-Dec-12	1.6	80600	<5	1 J	186000 J	<1	--	1.5 J	0.87 J
MW-03	18-Feb-14	1.2 J	66900 J	1.3 J	<1 J	198000 J	<1 J	--	<5 J	0.8 J
MW-05	20-Mar-12	2.6 J	4880	4.1 J	<1	139000 J	<1	--	2.2 J	1.6 J
MW-05	29-May-12	1.8	4980	4 J	<1	143000 J	<1	--	2.5 J	23.2 J
MW-05	05-Sep-12	2.7 J	4530 J	3.9 J	<1	123000 J	<1	--	2.4 J	5.9 J
MW-05	03-Dec-12	1.5	5450	2.4 J	1 J	140000 J	0.018 J	--	2.8 J	<2
MW-05	29-Jan-14	1.6 J	5100 J	96 J	47.6 J	141000 J	52.5 J	--	3 J	452 J
MW-06	26-Feb-10	--	--	--	--	--	--	--	--	--
MW-06	20-Mar-12	2.6 J	5280	4.5 J	<1	134000 J	<1	--	2 J	0.98 J
MW-06	29-May-12	2.3	5720	5.4	<1	140000 J	<1	--	2.3 J	10.3 J
MW-06	04-Sep-12	2.6 J	4470 J	4.5 J	<1	115000 J	<1	--	2 J	4.5 J
MW-06	03-Dec-12	1.5	5820	3.6 J	1 J	132000 J	<1	--	2.2 J	1.1 J
MW-06	29-Jan-14	0.91 J	5600 J	3.4 J	<1 J	130000 J	<1 J	--	1.9 J	1.5 J
PW-2 MIDDLE	06-Jul-16	--	--	4.2	--	--	--	--	--	--
PW-2 START	05-Jul-16	--	--	4.3	--	--	--	--	--	--
SWDI-1	13-Jul-15	14	--	<5	<5	--	--	--	--	53

Table 5-9
Recent Dissolved Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	Nickel (µg/L)	Potassium (µg/L)	Selenium (µg/L)	Silver (µg/L)	Sodium (µg/L)	Thallium (µg/L)	Uranium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
Screening Criteria	CO Reg 41 GSL (µg/L)	100	--	50	50	--	2	30	100	5000
SWDI-2	13-Jul-15	5.9	--	3.1 J	<5	--	--	--	--	15
SWDI-3	13-Jul-15	3.3	--	<5	<5	--	--	--	--	4.6 J
SWDI-4	14-Jul-15	2.9	--	1.5 J	<5	--	--	--	--	28
SWDI-5	13-Jul-15	9.2	--	<5	<5	--	--	--	--	16
SWDI-6	14-Jul-15	4.7	--	<5	0.052 J	--	--	--	--	39
SWDI-7	14-Jul-15	4.9	--	<5	<5	--	--	--	--	7.5 J
SWDI-8	14-Jul-15	4.4	--	<5	<5	--	--	--	--	4.7 J
SWDI-10	14-Jul-15	9.7	--	1.7 J	0.038 J	--	--	--	--	6.7 J
SWDI-12	14-Jul-15	8.3	--	3.5 J	0.077 J	--	--	--	--	23
SWDI-13	15-Jul-15	8.3	--	1.1 J	0.17 J	--	--	--	--	45
SWDI-14	15-Jul-15	3.6	--	2.1 J	0.093 J	--	--	--	--	11
SWDI-15	14-Jul-15	5.8	--	4.2 J	0.050 J	--	--	--	--	14
SWDI-16	15-Jul-15	20	--	1.8 J	<5	--	--	--	--	42
TH-45	19-Jan-16	1.1 J	--	5	0.066 J	--	--	31	--	2 J
TH-46	19-Jan-16	--	--	--	0.033	--	--	29	--	2 J
TH-47	19-Jan-16	2.5	--	3.3 J	0.033	--	--	30	--	2.9 J
TH-47D	19-Jan-16	2.7	--	3.4 J	0.033	--	--	41	--	3.8 J
TH-48	19-Jan-16	2	--	5.4	0.033	--	--	33	--	3.6 J
TH-52	19-Jan-16	--	--	--	--	--	--	28	--	4.6 J

Notes and Abbreviations:

- A "<" indicates the compound was not detected at concentrations above the reporting limit.
- If italicized it displays the method detection limit instead of the reporting limit.
- Bold** indicates a detection above the GSL
- J - indicates an estimated value
- µg/L - micrograms per liter
- GSL - groundwater screening level

Table 5-10

Historical VOC and SVOC Groundwater Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	SVOCs				
		Acenaphthene (µg/L)	Di-n-butyl phthalate (µg/L)	Naphthalene (µg/L)	Phenanthrene (µg/L)	Phenol (µg/L)
Screening Criteria	CO Reg 41 GW SL (µg/L)	420	700	140	--	2100
DC-2	05-Jun-97	<10	<10 J	<10	<10	<10
DC-3	05-Jun-97	3 J	<10 J	40 J	3 J	7 J
DC-4	05-Jun-97	<10	<10 J	4 J	<10	<10
MW-02	18-Aug-05	<10	<10	<10	<10	<10
MW-03	18-Aug-05	<10	<10	1.8 J	<10	<10

Table 5-10

Historical VOC and SVOC Groundwater Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs				
		1,2,4- Trimethylbenzene (µg/L)	1,4- Dichlorobenzene (µg/L)	Benzene (µg/L)	Chlorobenzene (µg/L)	Chloroform (µg/L)
Screening Criteria	CO Reg 41 GW SL (µg/L)	70	75	5	100	3.5
DC-2	05-Jun-97	<5	<10	<5	<5	<5
DC-3	05-Jun-97	<5	<10	<5	<5	<5
DC-4	05-Jun-97	<5	<10	<5	<5	<5
MW-02	18-Aug-05	<1.0	<10	<1	<1.0	<1.0
MW-03	18-Aug-05	0.26 J	2 J	1.3	25	<1. J

Table 5-10

Historical VOC and SVOC Groundwater Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs				
		cis-1,2- Dichloroethylene (µg/L)	Isopropylbenzene (Cumene) (µg/L)	Methylene chloride (µg/L)	sec- Butylbenzene (µg/L)	tert-Butyl methyl ether (µg/L)
Screening Criteria	CO Reg 41 GW SL (µg/L)	70	--	5	--	--
DC-2	05-Jun-97	<5	<5	<5	<5	--
DC-3	05-Jun-97	<5	<5	<5	<5	--
DC-4	05-Jun-97	<5	<5	<5	<5	--
MW-02	18-Aug-05	0.15 J	<1.0	0.33 J	<1.0	<5.0
MW-03	18-Aug-05	0.4 J	0.23 J	<5	0.34 J	0.69 J

Table 5-10

Historical VOC and SVOC Groundwater Data

VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs	
		Total 1,2- Dichloroethene (µg/L)	Benzoic acid (µg/L)
Screening Criteria	CO Reg 41 GW SL (µg/L)	--	--
DC-2	05-Jun-97	--	<50
DC-3	05-Jun-97	--	20 J
DC-4	05-Jun-97	--	5 J
MW-02	18-Aug-05	0.15 J	--
MW-03	18-Aug-05	0.4 J	--

Notes and Abbreviations:

A "<" indicates the compound was not detected at concentrations above the reporting limit.

The reporting limit is provided after for reference.

J - indicates an estimated value

µg/L - micrograms per liter

SVOC - semi-volatile organic compound

VOC - volatile organic compound

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	SVOCs									
		1-Methyl naphthalene (µg/L)	2-Chlorophenol (µg/L)	2-Methyl naphthalene (µg/L)	Acenaphthene (µg/L)	Benzaldehyde (µg/L)	bis(2-ethylhexyl) Phthalate (µg/L)	Caprolactam (µg/L)	Diethyl Phthalate (µg/L)	Di-n-butyl phthalate (µg/L)	Naphthalene (µg/L)
CO Reg 41 GSL	(µg/L)	--	35	--	420	--	6	--	5600	700	140
CTL MW-01	05-Apr-11	--	<3.8	<9.5	<1.9	--	<3.8	--	<9.5	<3.8	<1.9
CTL MW-01	30-Jan-14	--	<5	<5	<5	<5	5 J	<5	<5	<5	<5
CTL MW-01	10-Mar-14	--	--	--	--	--	--	--	--	--	--
CTL MW-02	05-Apr-11	--	<1.9	<4.7	<0.95	--	<1.9	--	<4.7	<1.9	<0.95
CTL MW-02	30-Jan-14	--	<5	<5	<5	<5	5 J	<5	<5	<5	<5
CTL MW-03	05-Apr-11	--	<1.9	<4.7	<0.95	--	<1.9	--	<4.7	<1.9	<0.95
CTL MW-04	05-Apr-11	--	<2.5	<6.1	<1.2	--	<2.5	--	<6.1	<2.5	<1.2
CTL MW-04	18-Feb-14	--	<5	<5	<5	0.81 J	5 J	<5	0.49 J	<5	<5
CTL MW-05	05-Apr-11	--	<1.9	<4.7	<0.95	--	<1.9	--	<4.7	<1.9	<0.95
CTL MW-05	18-Feb-14	--	<5	<5	<5	0.46 J	5 J	<5	<5	<5	<5
CTL MW-06	05-Apr-11	--	<2.5	<6.1	<1.2	--	<2.5	--	<6.1	<2.5	1.2
CTL MW-06	30-Jan-14	--	<50	<110	<50	<110	<50	<110	<110	<110	<110
CTL MW-06	10-Mar-14	--	--	--	--	--	--	--	--	--	--
CTL MW-06	15-Jul-15	--	--	--	--	--	--	--	--	--	--
HS-01	24-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-02	25-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-03	25-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-04	25-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-05	24-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-07	25-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
HS-08	25-Feb-10	0.57	--	0.40	0.36	--	--	--	--	--	3.8
MW-01	26-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
MW-01	21-Mar-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-01	30-May-12	--	<5	<5	<5	<5	1.5 J	<5	<5	<5	<5
MW-01	06-Sep-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-01	04-Dec-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-01	11-Feb-14	--	<5	<5	<5	<5	5 J	<5	<5	<5	<5
MW-02	21-Mar-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-02	30-May-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-02	06-Sep-12	--	<5	<5	<5	<5	<5	1.3 J	<5	<5	<5
MW-02	04-Dec-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-02	11-Feb-14	--	<15	<15	<15	<15	<15	2 J	<15	<15	<15
MW-03	22-Mar-12	--	1.4 J	<5	<5	<5	<5	<5	<5	<5	1.7 J
MW-03	31-May-12	--	1.5 J	<5	<5	<5	<5	<5	<5	<5	2.5 J
MW-03	06-Sep-12	--	1.2 J	<5	<5	<5	<5	<5	<5	<5	1.4 J
MW-03	05-Dec-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-03	18-Feb-14	--	1.6 J	<5	<5	0.52 J	<5	<5	0.51 J	<5	1.2 J
MW-05	20-Mar-12	--	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6
MW-05	29-May-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-05	05-Sep-12	--	<5	<5	<5	<5	<5	<5	<5	2.6 J	<5
MW-05	03-Dec-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-05	29-Jan-14	--	<5	<5	<5	<5	5 J	<5	<5	1.4 J	<5
MW-06	26-Feb-10	<0.30	--	<0.30	<0.30	--	--	--	--	--	<0.30
MW-06	20-Mar-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-06	04-Sep-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-06	03-Dec-12	--	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-06	29-Jan-14	--	<5	<5	<5	<5	5 J	<5	<5	1.5 J	<5

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	SVOCs									
		1-Methyl naphthalene (µg/L)	2-Chlorophenol (µg/L)	2-Methyl naphthalene (µg/L)	Acenaphthene (µg/L)	Benzaldehyde (µg/L)	bis(2-ethylhexyl) Phthalate (µg/L)	Caprolactam (µg/L)	Diethyl Phthalate (µg/L)	Di-n-butyl phthalate (µg/L)	Naphthalene (µg/L)
CO Reg 41 GSL	(µg/L)	--	35	--	420	--	6	--	5600	700	140
QUAD 1	13-May-15	--	<1.9 J	<0.28 J	<0.27 J	<1.9 J	<0.53 J	<4.8 J	<0.36 J	<1.1 J	<0.28 J
QUAD 2	10-Jun-15	--	<1.9	<0.28	<0.27	<1.9	3.3	6.2	<0.36	<1.1	<0.28
QUAD 3	05-Jun-15	--	--	--	--	--	--	--	--	--	--
QUAD 4	04-Jun-15	--	--	--	--	--	--	--	--	--	--
SWDI-1	13-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-2	13-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-3	13-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-4	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-5	13-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-6	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-7	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-8	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-10	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-12	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-13	15-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-14	15-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-15	14-Jul-15	--	--	--	--	--	--	--	--	--	--
SWDI-16	15-Jul-15	--	--	--	--	--	--	--	--	--	--
TH-45	19-Jan-16	--	--	--	--	--	--	--	--	--	--
TH-46	19-Jan-16	--	--	--	--	--	--	--	--	--	--
TH-47	19-Jan-16	--	--	--	--	--	--	--	--	--	--
TH-47D	19-Jan-16	--	--	--	--	--	--	--	--	--	--
TH-48	19-Jan-16	--	--	--	--	--	--	--	--	--	--
TH-52	19-Jan-16	--	--	--	--	--	--	--	--	--	--

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs											
		1,1,1-Trichloroethane (µg/L)	1,1,2-Trichloro-1,2,2-trifluoroethane (µg/L)	1,1-Dichloro ethene (µg/L)	1,2,4-Trichloro benzene (µg/L)	1,2-Dichloro ethane (µg/L)	1,3-Dichloro benzene (µg/L)	1,4-Dichloro benzene (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Bromodichloro methane (µg/L)	Carbon disulfide (µg/L)	Chlorobenzene (µg/L)
CO Reg 41 GSL	(µg/L)	200	--	7	70	5	500	75	6300	5	0.56	--	100
CTL-MW-01	05-Apr-11	<2	--	<2	<9.5	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-01	30-Jan-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
CTL-MW-01	10-Mar-14	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	<0.5	<5	4.5	<0.5	<0.5	4.4
CTL-MW-02	05-Apr-11	<2	--	<2	<4.7	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-02	30-Jan-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
CTL-MW-03	05-Apr-11	<2	--	<2	<4.7	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-04	05-Apr-11	<2	--	<2	<6.1	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-04	18-Feb-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
CTL-MW-05	05-Apr-11	<2	--	<2	<4.7	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-05	18-Feb-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	0.14 J
CTL-MW-06	05-Apr-11	<2	--	<2	<6.1	<2	<2	<2	<10	<1	<2	<2	<2
CTL-MW-06	30-Jan-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2 J	<0.5	<0.5	<0.5	<0.5
CTL-MW-06	10-Mar-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5 J	<0.5	<0.5	<0.5	<0.5
CTL-MW-06	15-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
HS-01	24-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
HS-02	25-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
HS-03	25-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
HS-04	25-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
HS-05	24-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
HS-07	25-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	4.1	<1.0	<2.0	<2.0	<2.0
HS-08	25-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
MW-01	26-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	5.1	<1.0	<2.0	<2.0	<2.0
MW-01	21-Mar-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-01	30-May-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-01	06-Sep-12	<0.5	0.32 J	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-01	04-Dec-12	<0.5	<0.5	<0.5	2 J	<0.5	2 J	2 J	<5	<0.5	<0.5	<0.5	<0.5 J
MW-01	11-Feb-14	<0.5	<5	<5	<5	<0.5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5
MW-02	21-Mar-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-02	30-May-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5 J	<0.5	<0.5
MW-02	06-Sep-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-02	04-Dec-12	<0.5	<0.5	<0.5	<0.5	0.15 J	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-02	11-Feb-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-03	22-Mar-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.7	<5	2.6	<0.5	<0.5	99 J
MW-03	31-May-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.5	<5	1.7	<0.5	<0.5	73 J
MW-03	06-Sep-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	7.3	<5	1.9	<0.5	<0.5	85 J
MW-03	05-Dec-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.4	2.6 J	1.6	<0.5	<0.5	58 J
MW-03	18-Feb-14	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	2.5	<0.5	<0.5	130 J
MW-05	20-Mar-12	0.036 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-05	29-May-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-05	05-Sep-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-05	03-Dec-12	<0.5	<0.5	<0.5	0.5 J	<0.5	0.5 J	0.5 J	<5	<0.5	<0.5	<0.5	<0.5 J
MW-05	29-Jan-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-06	26-Feb-10	<2.0	--	<2.0	--	<2.0	<2.0	<2.0	<10	<1.0	<2.0	<2.0	<2.0
MW-06	20-Mar-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-06	04-Sep-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5
MW-06	03-Dec-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	0.11 J	<0.5	<0.5
MW-06	29-Jan-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs											
		1,1,1-Trichloroethane (µg/L)	1,1,2-Trichloro-1,2,2-trifluoroethane (µg/L)	1,1-Dichloro ethene (µg/L)	1,2,4-Trichloro benzene (µg/L)	1,2-Dichloro ethane (µg/L)	1,3-Dichloro benzene (µg/L)	1,4-Dichloro benzene (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Bromodichloro methane (µg/L)	Carbon disulfide (µg/L)	Chlorobenzene (µg/L)
CO Reg 41 GSL	(µg/L)	200	--	7	70	5	500	75	6300	5	0.56	--	100
QUAD 1	13-May-15	<0.16 J	<0.42 J	<0.23 J	<0.27 J	<0.13 J	<0.29 J	<0.3 J	<1.9 J	<0.16 J	<0.17 J	<0.45 J	<0.17 J
QUAD 2	10-Jun-15	<0.16	<0.42	<0.23	<0.27	<0.13	<0.29	<0.31	3	<0.16	<0.17	<0.45	<0.17
QUAD 3	05-Jun-15	<0.16	<0.42	<0.23	<0.21	<0.13	<0.13	<0.16	<1.9	<0.16	<0.17	<0.45	<0.17
QUAD 4	04-Jun-15	<0.16	<0.42	<0.23	<0.21	<0.13	<0.13	<0.16	<1.9	<0.16	<0.17	1.3	<0.17
SWDI-1	13-Jul-15	<1	--	<1	--	<1	--	--	--	6	--	--	11
SWDI-2	13-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-3	13-Jul-15	<1	--	<1	--	<1	--	--	--	0.78 J	--	--	<1
SWDI-4	14-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-5	13-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-6	14-Jul-15	<1	--	<1	--	<1	--	--	--	0.25 J	--	--	<1
SWDI-7	14-Jul-15	<1	--	<1	--	<1	--	--	--	0.27 J	--	--	0.21 J
SWDI-8	14-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-10	14-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-12	14-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-13	15-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-14	15-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-15	14-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
SWDI-16	15-Jul-15	<1	--	<1	--	<1	--	--	--	<1	--	--	<1
TH-45	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17
TH-46	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17
TH-47	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17
TH-47D	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17
TH-48	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17
TH-52	19-Jan-16	<0.16	--	<0.23	--	<0.13	--	--	--	<0.16	--	--	<0.17

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs													
		Chloroform (µg/L)	cis-1,2-Dichloro ethylene (µg/L)	Cyclohexane (µg/L)	Ethyl benzene (µg/L)	Isopropyl benzene (µg/L)	m,p-Xylene (µg/L)	Methyl ethyl ketone (µg/L)	Methyl cyclohexane (µg/L)	Methylene chloride (µg/L)	o-Xylene (µg/L)	tert-Butyl methyl ether (µg/L)	PCE (µg/L)	Toluene (µg/L)	TCE (µg/L)
CO Reg 41 GSL	(µg/L)	3.5	70	--	700	--	--	--	--	5	--	--	5	1000	5
CTL-MW-01	05-Apr-11	4.1	<2	--	<2	--	--	<10	--	<5	--	<2	1.1	<2	<2
CTL-MW-01	30-Jan-14	1.4	4.2	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	18	<0.5	2.7
CTL-MW-01	10-Mar-14	1.5	4.9	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	20	4.6	7.4
CTL-MW-02	05-Apr-11	1.1 J	<2	--	<2	--	--	<10	--	<5	--	<2	<2	<2	<2
CTL-MW-02	30-Jan-14	3	0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.25 J	<0.5	<0.5
CTL-MW-03	05-Apr-11	2.6	<2	--	<2	--	--	<10	--	<5	--	<2	<2	<2	<2
CTL-MW-04	05-Apr-11	<2	0.46 J	--	<2	--	--	<10	--	<5	--	<2	1.2 J	<2	<2
CTL-MW-04	18-Feb-14	<0.5	3.1	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	0.96
CTL-MW-05	05-Apr-11	<2	<2	--	<2	--	--	<10	--	<5	--	<2	<2	<2	<2
CTL-MW-05	18-Feb-14	<0.5	0.5	<0.5	<0.5	0.21 J	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CTL-MW-06	05-Apr-11	<2	31.6	--	0.39 J	--	--	<10	--	<5	--	<2	26.3	<2	10
CTL-MW-06	30-Jan-14	<0.5	8.7	<0.5	<0.5	0.23 J	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.35 J	0.5	0.65
CTL-MW-06	10-Mar-14	<0.5	16	<0.5	<0.5	0.13 J	<0.5	<5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	2.6
CTL-MW-06	15-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	3	<1	1.7
HS-01	24-Feb-10	<2.0	10.4	--	<2.0	--	--	<5.0	--	<5.0	--	--	24.8	<2.0	5.8
HS-02	25-Feb-10	1.1	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	1.0	<2.0	<2.0
HS-03	25-Feb-10	3.1	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	2.8	<2.0	<2.0
HS-04	25-Feb-10	6.0	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	<2.0	<2.0	<2.0
HS-05	24-Feb-10	2.9	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	<2.0	<2.0	<2.0
HS-07	25-Feb-10	0.73	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	<2.0	<2.0	<2.0
HS-08	25-Feb-10	<2.0	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	<2.0	<2.0	<2.0
MW-01	26-Feb-10	<2.0	12.2	--	<2.0	--	--	<5.0	--	<5.0	--	--	12.7	<2.0	4.6
MW-01	21-Mar-12	0.13 J	50 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	44 J	0.12 J	15
MW-01	30-May-12	<0.5	54 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	38 J	<0.5	13
MW-01	06-Sep-12	0.33 J	55 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	52 J	<0.5	17
MW-01	04-Dec-12	<0.5	49 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	0.14 J	<0.5	<0.5	34 J	<0.5	12
MW-01	11-Feb-14	<0.5	69 J	<5	<0.5	<0.5	<5	50	<5	<0.5	<5	<5	41 J	<0.5	19
MW-02	21-Mar-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	0.5	<0.5	0.088 J	<0.5
MW-02	30-May-12	<0.5	<0.5	<0.5 J	<0.5	<0.5	<0.5	<5	<0.5 J	<0.5	<0.5	0.44 J	<0.5	<0.5	<0.5
MW-02	06-Sep-12	<0.5	0.2 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	0.4 J	<0.5	<0.5	<0.5
MW-02	04-Dec-12	<0.5	0.17 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	0.13 J	<0.5	0.33 J	<0.5	<0.5	<0.5
MW-02	11-Feb-14	<0.5	0.16 J	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	0.4 J	<0.5	<0.5	<0.5
MW-03	22-Mar-12	<0.5	<0.5	1.2	<0.5	1.5	0.1 J	<5	<0.5	<0.5	0.12 J	0.81	<0.5	0.15 J	<0.5
MW-03	31-May-12	<0.5	<0.5	0.83	<0.5	1.2	<0.5	<5	0.6	<0.5	<0.5	0.62	<0.5	<0.5	<0.5
MW-03	06-Sep-12	<0.5	0.17 J	1.1	<0.5	1.4	<0.5	<5	0.69	<0.5	<0.5	0.64	<0.5	<0.5	<0.5
MW-03	05-Dec-12	<0.5	0.13 J	0.62	<0.5	1	<0.5	<5	0.37 J	<0.5	<0.5	0.5 J	<0.5	0.13 J	<0.5
MW-03	18-Feb-14	<0.5	0.13 J	0.73	<5	1.1	<0.5	<5	0.55	<5	<0.5	0.59	<0.5	<0.5	5.3
MW-05	20-Mar-12	1	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.46 J	0.12 J	0.15 J
MW-05	29-May-12	1	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.37 J	<0.5	<0.5
MW-05	05-Sep-12	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.43 J	<0.5	0.25 J
MW-05	03-Dec-12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	0.16 J	<0.5	<0.5	0.33 J	<0.5	0.14 J
MW-05	29-Jan-14	0.74	0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.25 J	<0.5	<0.5
MW-06	26-Feb-10	2.1	<2.0	--	<2.0	--	--	<5.0	--	<5.0	--	--	<2.0	<2.0	<2.0
MW-06	20-Mar-12	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.17 J	0.11 J	<0.5
MW-06	04-Sep-12	4.7	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.27 J	<0.5	<0.5
MW-06	03-Dec-12	4	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	0.14 J	<0.5	<0.5	0.2 J	<0.5	<0.5
MW-06	29-Jan-14	4.8	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	0.26 J	<0.5	0.5

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs													
		Chloroform (µg/L)	cis-1,2-Dichloro ethylene (µg/L)	Cyclohexane (µg/L)	Ethyl benzene (µg/L)	Isopropyl benzene (µg/L)	m,p-Xylene (µg/L)	Methyl ethyl ketone (µg/L)	Methyl cyclohexane (µg/L)	Methylene chloride (µg/L)	o-Xylene (µg/L)	tert-Butyl methyl ether (µg/L)	PCE (µg/L)	Toluene (µg/L)	TCE (µg/L)
CO Reg 41 GSL	(µg/L)	3.5	70	--	700	--	--	--	--	5	--	--	5	1000	5
QUAD 1	13-May-15	0.37 J	<0.15 J	<0.28 J	<0.16 J	<0.19 J	<0.34 J	<2 J	<0.36 J	<0.32 J	<0.19 J	<0.25 J	0.27 J	<0.17 J	<0.16 J
QUAD 2	10-Jun-15	0.6	<0.15	<0.28	<0.16	<0.19	<0.34	<2	<0.36	<0.32	<0.19	<0.25	0.21	<0.17	<0.16
QUAD 3	05-Jun-15	5.9	<0.15	<0.28	<0.16	<0.19	<0.34	<2	<0.36	<0.32	<0.19	<0.25	0.54	<0.17	<0.16
QUAD 4	04-Jun-15	5.3	<0.15	<0.28	<0.16	<0.19	<0.34	<2	<0.36	<0.32	<0.19	<0.25	0.34	<0.17	<0.16
SWDI-1	13-Jul-15	<1	--	--	2.9	--	--	--	--	--	--	--	0.47 J	0.5 J	<1
SWDI-2	13-Jul-15	0.49 J	--	--	<1	--	--	--	--	--	--	--	13	0.2 J	7.9
SWDI-3	13-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	0.92 J	0.41 J	0.41 J
SWDI-4	14-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	19	<1	8.3
SWDI-5	13-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	1.4 J	0.18 J	0.31 J
SWDI-6	14-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	<1	0.3 J	<1
SWDI-7	14-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	5.2 J	<1	3 J
SWDI-8	14-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	2.2	<1	6.2
SWDI-10	14-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	1.1	<1	0.46 J
SWDI-12	14-Jul-15	0.56 J	--	--	<1	--	--	--	--	--	--	--	11	<1	5
SWDI-13	15-Jul-15	0.18 J	--	--	<1	--	--	--	--	--	--	--	2.1	<1	1
SWDI-14	15-Jul-15	0.36 J	--	--	<1	--	--	--	--	--	--	--	7.1	0.18 J	2.4
SWDI-15	14-Jul-15	0.22 J	--	--	<1	--	--	--	--	--	--	--	5.2	<1	2.3
SWDI-16	15-Jul-15	<1	--	--	<1	--	--	--	--	--	--	--	12	<1	5.7
TH-45	19-Jan-16	1.1	--	--	<0.16	--	--	--	--	--	--	--	6	<0.17	1.3
TH-46	19-Jan-16	1.8	--	--	<0.16	--	--	--	--	--	--	--	6.6	<0.17	0.95 J
TH-47	19-Jan-16	1.9	--	--	<0.16	--	--	--	--	--	--	--	8.8	<0.17	1.9
TH-47D	19-Jan-16	1.9	--	--	<0.16	--	--	--	--	--	--	--	8.8	<0.17	1.9
TH-48	19-Jan-16	0.45 J	--	--	<0.16	--	--	--	--	--	--	--	13	<0.17	9
TH-52	19-Jan-16	0.36 J	--	--	<0.16	--	--	--	--	--	--	--	21	<0.17	10

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs	
		Vinyl chloride (µg/L)	Xylenes, Total (µg/L)
CO Reg 41 GSL	(µg/L)	2	10000
CTL-MW-01	05-Apr-11	<2	0.99
CTL-MW-01	30-Jan-14	<0.5	--
CTL-MW-01	10-Mar-14	<0.5	--
CTL-MW-02	05-Apr-11	<2	0.61 J
CTL-MW-02	30-Jan-14	<0.5	--
CTL-MW-03	05-Apr-11	<2	0.73 J
CTL-MW-04	05-Apr-11	<2	0.75 J
CTL-MW-04	18-Feb-14	<0.5	--
CTL-MW-05	05-Apr-11	<2	<2
CTL-MW-05	18-Feb-14	<0.5	--
CTL-MW-06	05-Apr-11	<2	0.71 J
CTL-MW-06	30-Jan-14	<0.5	--
CTL-MW-06	10-Mar-14	<0.5	--
CTL-MW-06	15-Jul-15	<1	--
HS-01	24-Feb-10	<2.0	<4.0
HS-02	25-Feb-10	<2.0	<4.0
HS-03	25-Feb-10	<2.0	<4.0
HS-04	25-Feb-10	<2.0	<4.0
HS-05	24-Feb-10	<2.0	<4.0
HS-07	25-Feb-10	<2.0	<4.0
HS-08	25-Feb-10	<2.0	<4.0
MW-01	26-Feb-10	<2.0	<4.0
MW-01	21-Mar-12	<0.5	--
MW-01	30-May-12	<0.5	--
MW-01	06-Sep-12	<0.5	--
MW-01	04-Dec-12	<0.5	--
MW-01	11-Feb-14	<0.5	--
MW-02	21-Mar-12	<0.5	--
MW-02	30-May-12	<0.5	--
MW-02	06-Sep-12	<0.5	--
MW-02	04-Dec-12	<0.5	--
MW-02	11-Feb-14	<0.5	--
MW-03	22-Mar-12	<0.5	--
MW-03	31-May-12	<0.5	--
MW-03	06-Sep-12	0.13 J	--
MW-03	05-Dec-12	<0.5	--
MW-03	18-Feb-14	<0.5	--
MW-05	20-Mar-12	<0.5	--
MW-05	29-May-12	<0.5	--
MW-05	05-Sep-12	<0.5	--
MW-05	03-Dec-12	<0.5	--
MW-05	29-Jan-14	<0.5	--
MW-06	26-Feb-10	<2.0	<4.0
MW-06	20-Mar-12	<0.5	--
MW-06	04-Sep-12	<0.5	--
MW-06	03-Dec-12	<0.5	--
MW-06	29-Jan-14	<0.5	--

Table 5-11
Recent VOC and SVOC Groundwater Data
VB/I-70 Superfund Site, OU2

Location Identification	Sample Date	VOCs	
		Vinyl chloride (µg/L)	Xylenes, Total (µg/L)
CO Reg 41 GSL (µg/L)		2	10000
QUAD 1	13-May-15	<0.1 J	--
QUAD 2	10-Jun-15	<0.1	--
QUAD 3	05-Jun-15	<0.1	--
QUAD 4	04-Jun-15	<0.1	--
SWDI-1	13-Jul-15	0.42 J	--
SWDI-2	13-Jul-15	<1	--
SWDI-3	13-Jul-15	<1	--
SWDI-4	14-Jul-15	<1	--
SWDI-5	13-Jul-15	<1	--
SWDI-6	14-Jul-15	<1	--
SWDI-7	14-Jul-15	2.4 J	--
SWDI-8	14-Jul-15	0.58 J	--
SWDI-10	14-Jul-15	<1	--
SWDI-12	14-Jul-15	<1	--
SWDI-13	15-Jul-15	<1	--
SWDI-14	15-Jul-15	<1	--
SWDI-15	14-Jul-15	<1	--
SWDI-16	15-Jul-15	<1	--
TH-45	19-Jan-16	<0.1	--
TH-46	19-Jan-16	<0.1	--
TH-47	19-Jan-16	<0.1	--
TH-47D	19-Jan-16	<0.1	--
TH-48	19-Jan-16	<0.1	--
TH-52	19-Jan-16	<0.1	--

Notes and Abbreviations:
A "<" indicates the compound was not detected at concentrations above the reporting limit.
The reporting limit is provided after for reference.
Bold indicates a detection above the GSL
J - indicates an estimated value
µg/L - micrograms per liter
SVOC - semi-volatile organic compound
VOC - volatile organic compound

Table 5-12

Surface Water and Sediment Data

VB/I-70 Superfund Site, OU2

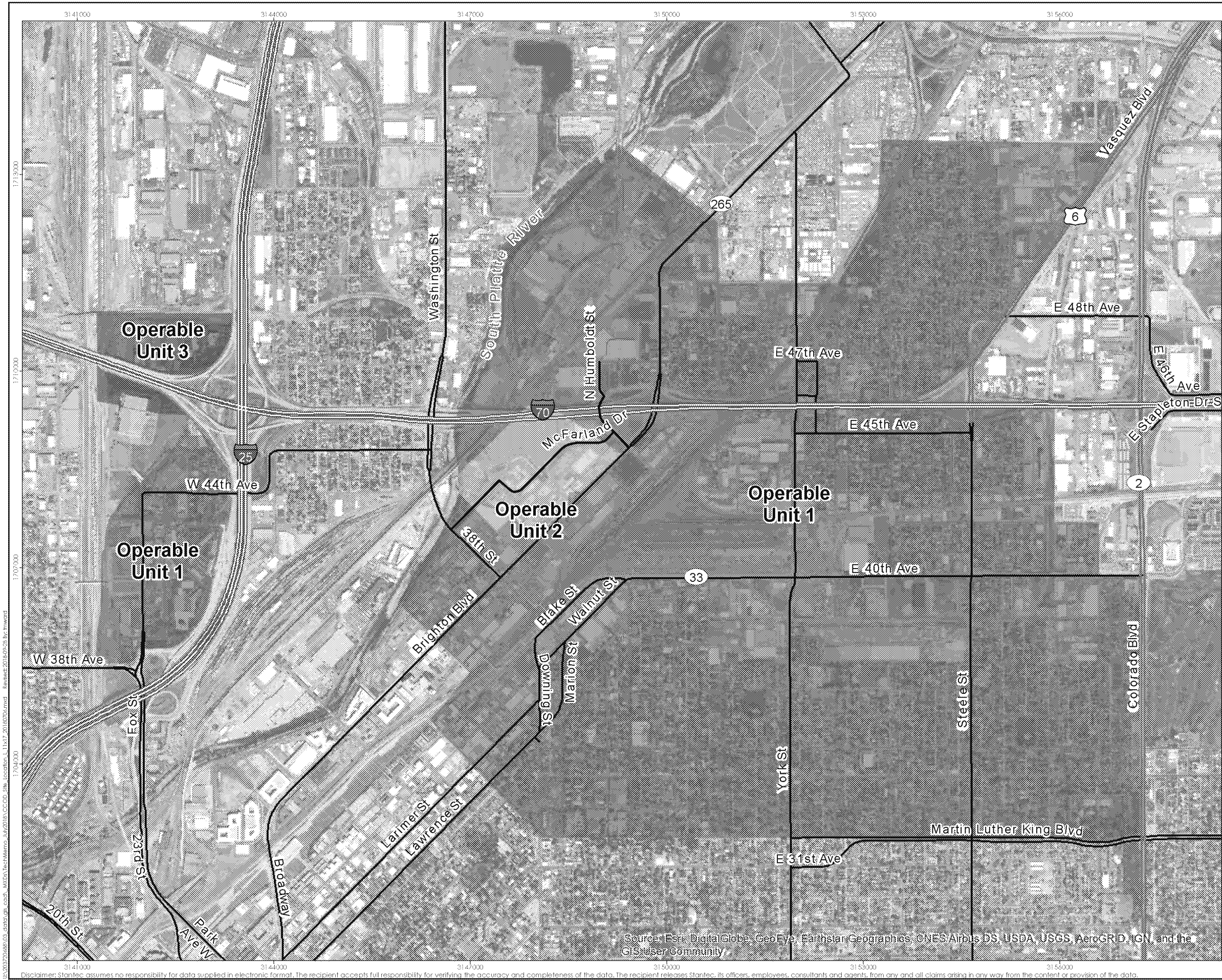
Location Identification Sample ID	Surface Water Dissolved Metals (µg/L)						Sediment (mg/kg)					
	N43			N46			N43			N46		
Analyte	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
Metals												
Arsenic	0.65	1.1	1.6	0.73	1.2	1.7	1.0	1.4	1.9	0.5	1.3	2.7
Cadmium	0.095	0.13	0.16	0.05	0.1	0.16	0.46	0.9	3	0.29	1.1	6.0
Copper	0.93	3.0	4.0	1.2	3.4	6.2	15	17	20	9.5	14	19
Lead	0.19	0.27	0.35	0.08	1.0	4.9	27	149	550	20	29	68
Zinc	5.0	19	30	6.9	22	30	83	101	130	70	127	438

Abbreviations:

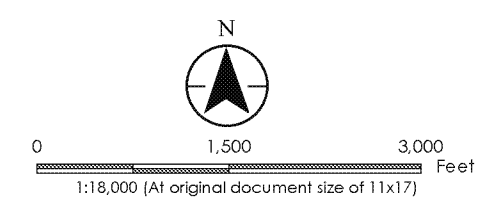
µg/L - micrograms per liter
 Avg - average of the detected results
 Max - maximum detected result
 mg/kg - milligrams per kilogram
 Min - minimum detected result

FIGURES



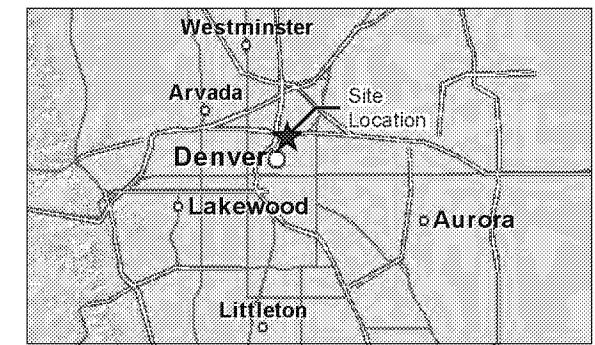


- Interstate
- Highway
- Major Road
- Operable Unit 1 (OU1)
- Operable Unit 2 (OU2)
- Operable Unit 3 (OU3)



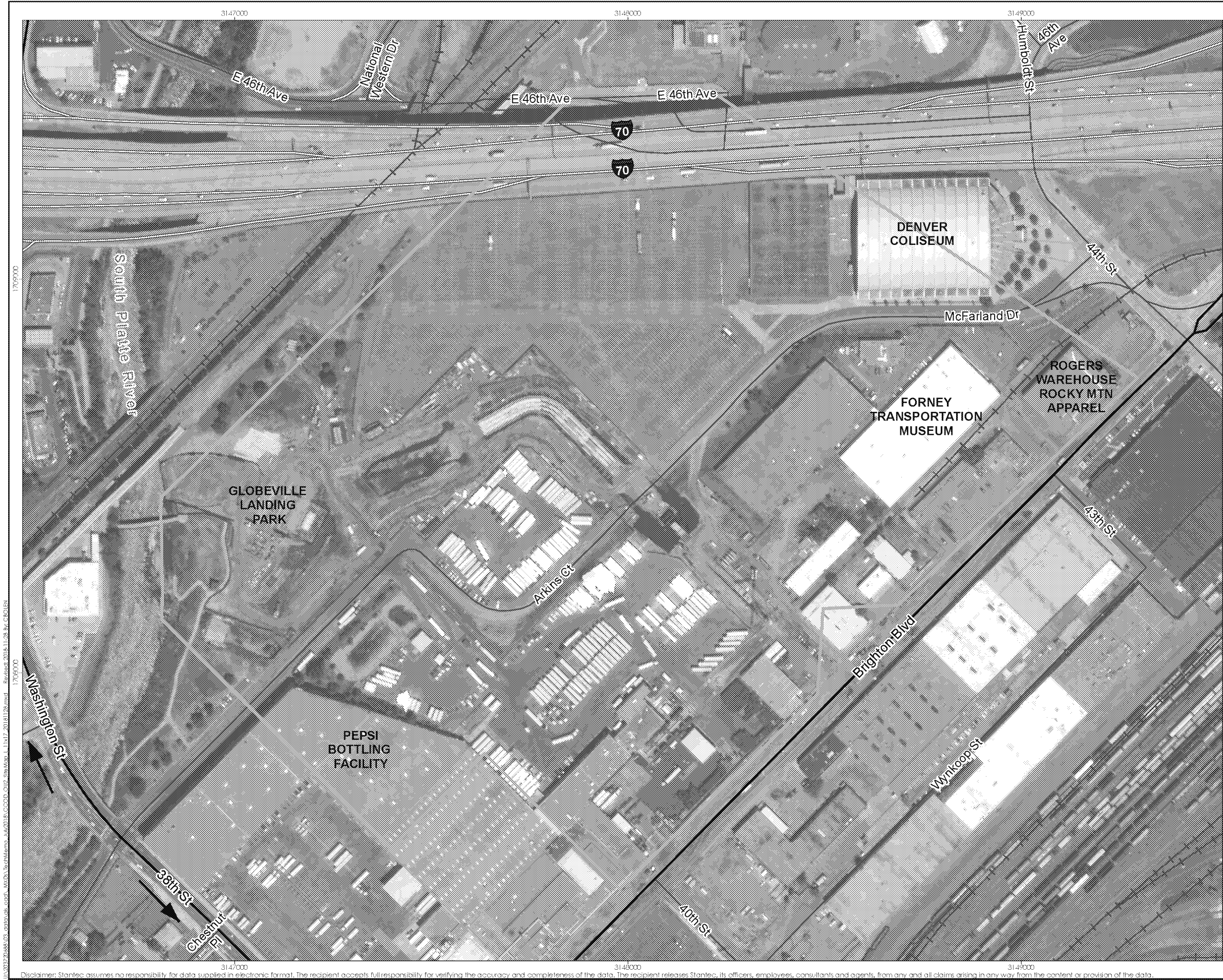
Notes

1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)

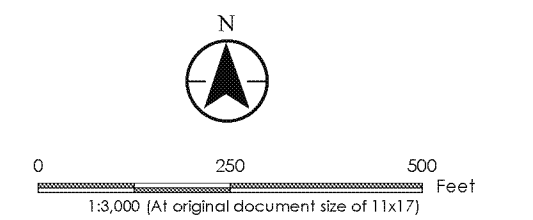


Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-07-09 Technical Review by TL on 2018-07-13
Client/Project	
City and County of Denver VB/I-70 OU2 Remedial Investigation	
Figure No.	
1	
Title	
Site Location	

Figure 1



- Interstate
- Major Road
- Local Street
- Railroad
- Operable Unit 2 (OU2)



Notes

1. Coordinate System: NAD 1983 HARN State Plane Colorado Central












2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-07-09 Technical Review by TL on 2018-07-13
Client/Project	
City and County of Denver VB/I-70 OU2 Remedial Investigation	
Figure No.	Title
2	

OU2 Site Features

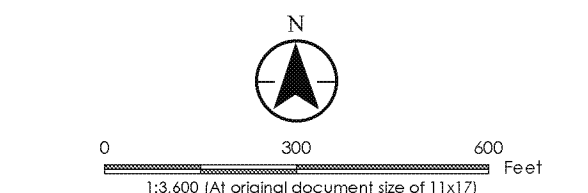
Figure 2



-  Globeville Landing Park Soil Sampling ¹
-  Barn Excavations ²
-  Cooling Water Wells
-  Brighton Blvd ⁹
-  I-70 10, 11, 12
-  Pepsi 4, 5, 6, 7, 8
-  RI Boreholes ³
-  Surface Water / Sediment
-  ASARCO
-  ASARCO - Approximate Limit of Unpaved Areas for Shallow Surface Soil Sampling
-  Operable Unit 2 (OU2)

References

1 - CH2MHill, 2002, Globeville Landing Park Soil Sampling Plan & Results, October.
2 - CH2MHill, 2004, Denver Coliseum Barn Soil Excavations and Stockpile Summary Report, Air Monitoring Results, Soil Sampling Results, and Removal Summary, February.
3 - EMSI, 2009, Remedial Investigation Vasequez Boulevard/Interstate 70 Superfund Site Operable Unit 2 - On-Facility Soils, Former Omaha and Grant Smelter, December 16.
4 - Transportation & Industrial Services, Inc., 2001a, Soil Testing for Lead & Arsenic, New Fleet Maintenance Building, Area 4, for the Pepsi Bottling Group, September 23.
5 - Transportation & Industrial Services, Inc., 2001b, Soil Testing for Lead & Arsenic, North Court Loading Docks and Related Paving, Area 3, for the Pepsi Bottling Group, October 29.
6 - Transportation & Industrial Services, Inc., 2001c, Soil Testing for Lead & Arsenic, Plastic Bottle Line Project Utility Trenches, for the Pepsi Bottling Group, November 4.
7 - Transportation & Industrial Services, Inc., 2002, Soil Testing for Lead & Arsenic, New Bulk Bottle Receiving Building, Area 6, for the Pepsi Bottling Group, April 12.
8 - Transportation & Industrial Services, Inc., 2002, Soil Testing for Lead and Arsenic, Plastic Bottle Line Project Stormwater Pond, November.
9 - URS, 2004, Phase II Report for Targeted Brownfields Assessment, Brighton Boulevard Site, City and County of Denver, Colorado, April 22.
10 - Walsh Environmental Scientists and Engineers, Inc. (Walsh), 1991a, Preliminary Site Investigation of the Properties at the Intersection of Washington Street and Interstate 70, February 27.
11 - Walsh, 1991b, Preliminary Site Investigation of the Properties for Modification of I-70, Washington to Brighton Boulevard, July 31.
12 - Walsh, 1997, Site Investigation Phase I Construction I-70 Modifications, North Washington Street to Humboldt Avenue, Denver, CO, July 31.



Notes

1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)

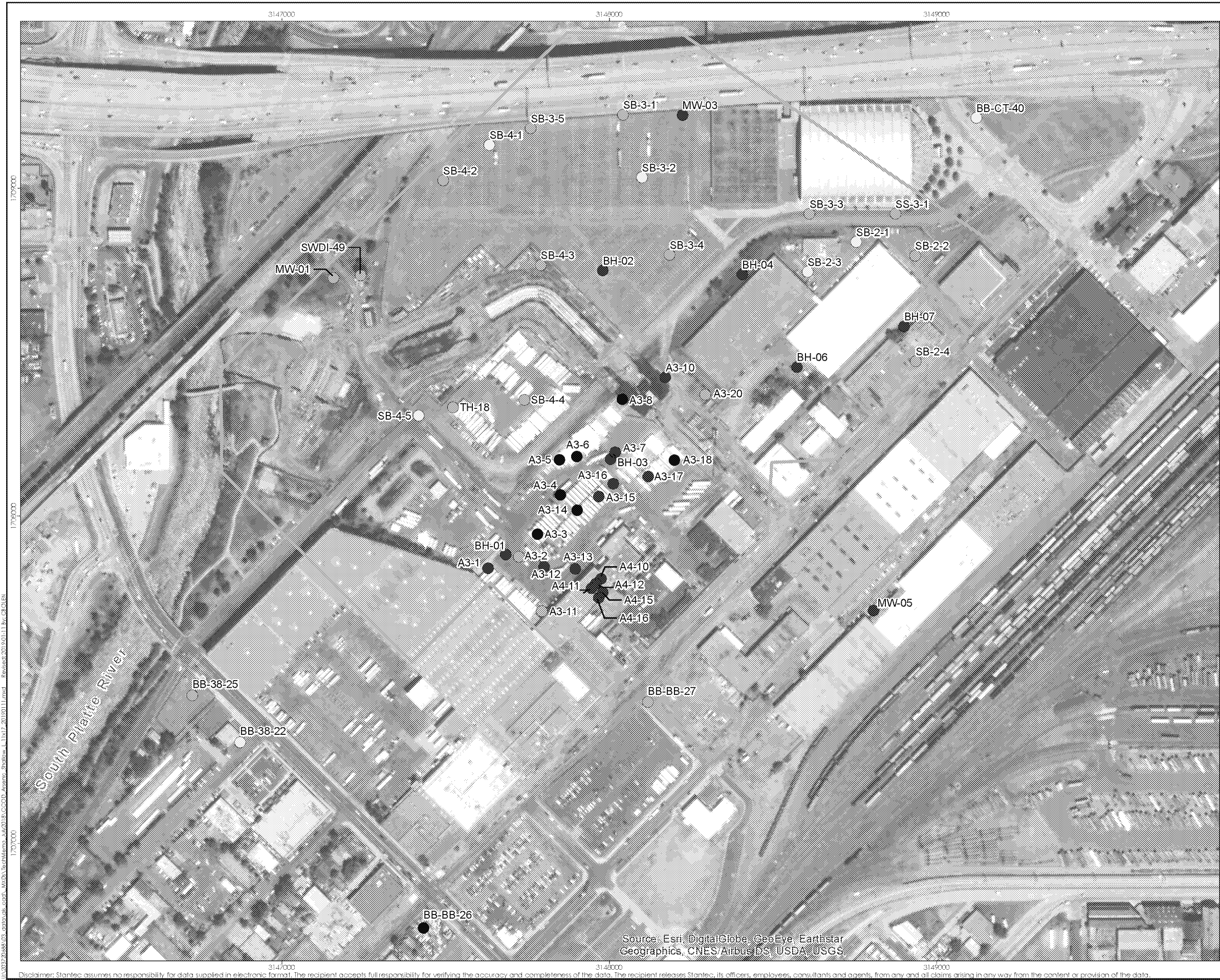
Project Location	Review
T3N, R6W, S23 Denver County, CO	Prepared by CBB on 2018-07-06 Technical Review by TL on 2018-07-13

Client/Project

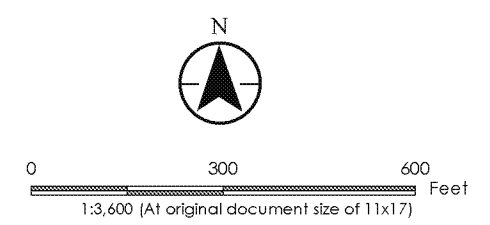
City and County of Denver
VB/I-70 OU2 Remedial Investigation

Figure No.
4

Title
Sample Locations from Pre-RI and 2009 RI



- Not detected above the reporting limit (ND)
- Detection > Residential, < Industrial and Background
- Detection > Residential and Industrial, < Background
- Detection > Residential, Industrial, and Background
- ⊕ Operable Unit 2 (OU2)



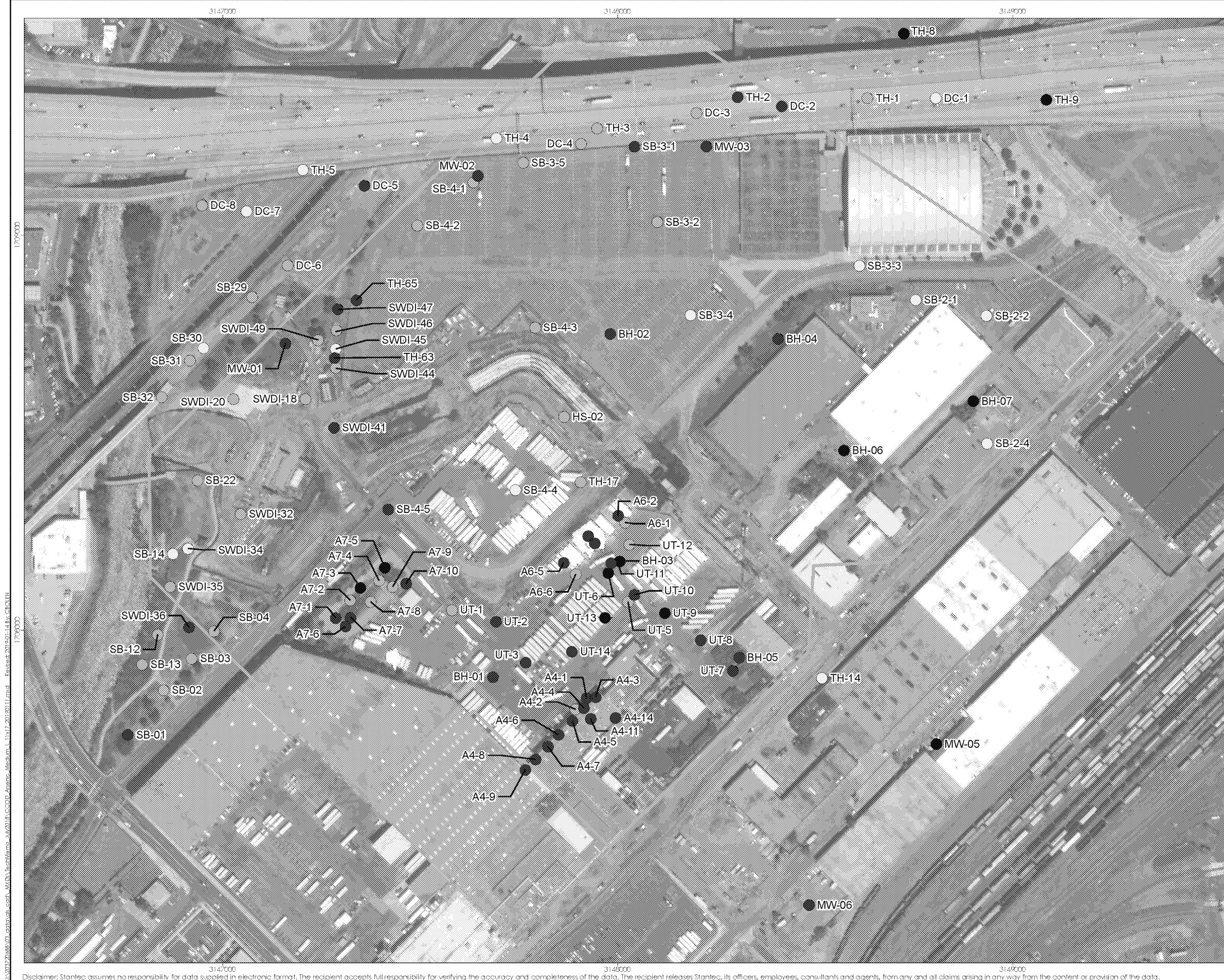
Notes

1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Services - DigitalGlobe (6/19/2017)
3. RSL: USEPA Regional Screening Level

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-05-31 Technical Review by TL on 2018-06-01
Client/Project	
City and County of Denver VB/I-70 OU2 Remedial Investigation	
Figure No.	
8a	
Title	

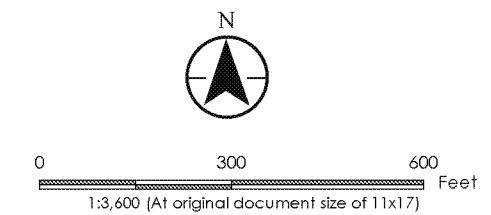
Arsenic Concentration in Shallow Soil

Figure 8a





- Detection below all screening levels
- Detection > Residential, < Industrial
- Detection > Residential and Industrial
- ⊕ Operable Unit 2 (OU2)



Notes

1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)
3. SL: USEPA Residential Screening Level

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-05-31 Technical Review by TL on 2018-06-01

Client/Project
City and County of Denver VB/I-70 OU2 Remedial Investigation

Figure No.
9a

Title
Lead Concentration in Shallow Soil

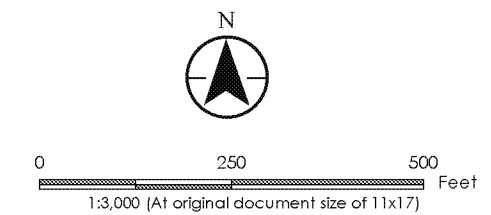
Figure 9a

\\03072683\03_04\03072683_000000733-00124_Lead_Shallow_A11x17_20180601.dwg - Revised: 2018-06-01 by CBB/TL

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



- Detection below all screening levels
- Detection > Residential, < Industrial
- Detection > Residential and Industrial
- ⊕ Operable Unit 2 (OU2)



Notes

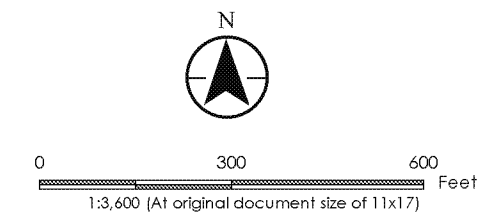
1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)
3. SL: USEPA Residential Screening Level

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-05-31 Technical Review by TL on 2018-06-01
Client/Project	
City and County of Denver VB/I-70 OU2 Remedial Investigation	
Figure No.	
9b	
Title	
Lead Concentration in Subsurface Soil	

Figure 9b



- Not detected above the reporting limit (ND)
- Detection below all screening levels
- Detection > Residential, < Industrial
- Detection > Residential and Industrial
- ⊕ Operable Unit 2 (OU2)



Notes
1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Services - DigitalGlobe (6/19/2017)
3. SL: USEPA Residential Screening Level

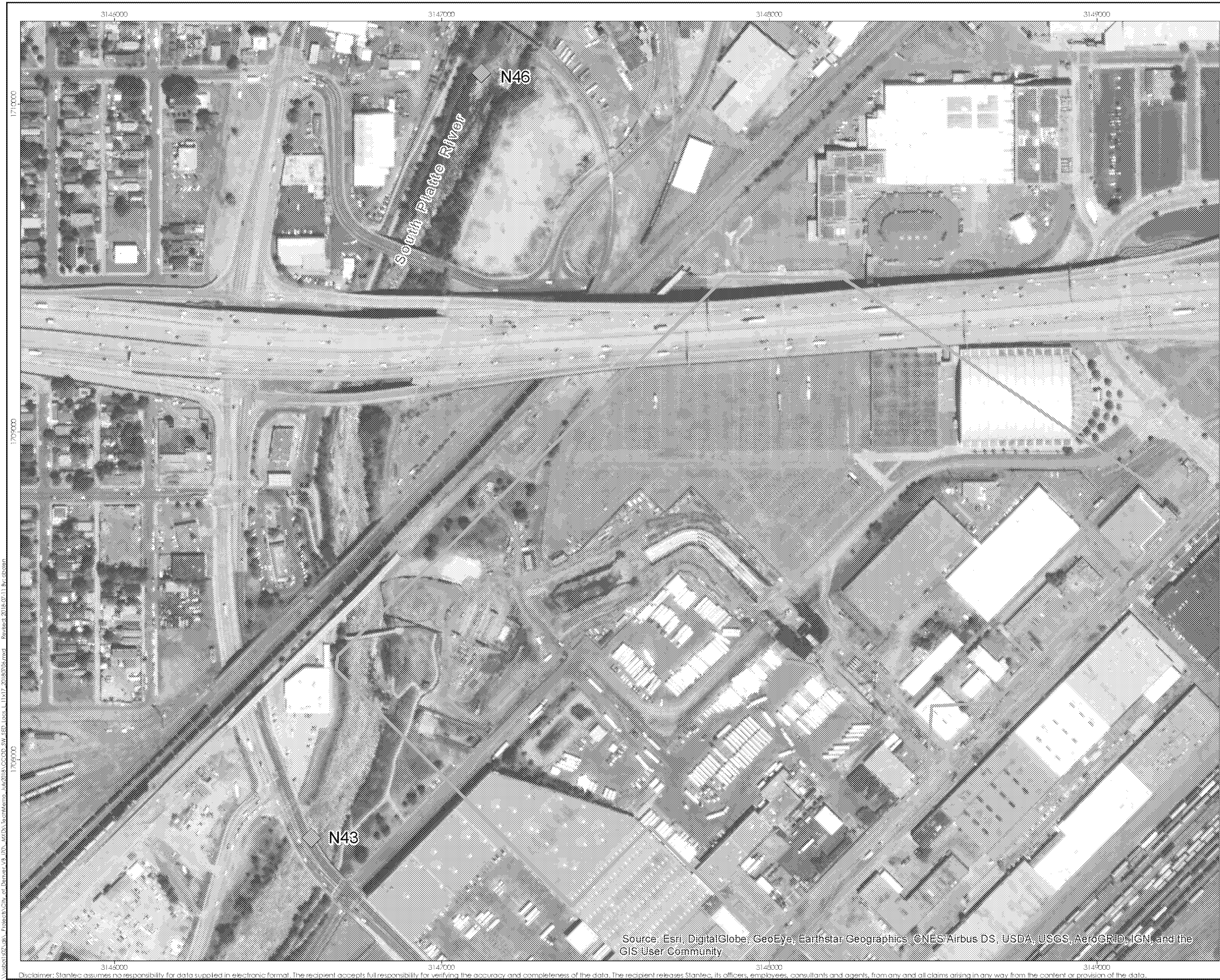
Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2018-05-31 Technical Review by TL on 2018-06-01



Client/Project
City and County of Denver VB/I-70 OU2 Remedial Investigation

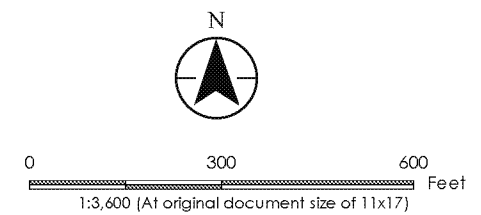
Figure No.
9c

Title
Lead Concentration in Deep Soil

Figure 9c



-  Surface Water and Sediment Sample Location
-  Operable Unit 2 (OU2)



Notes
1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)

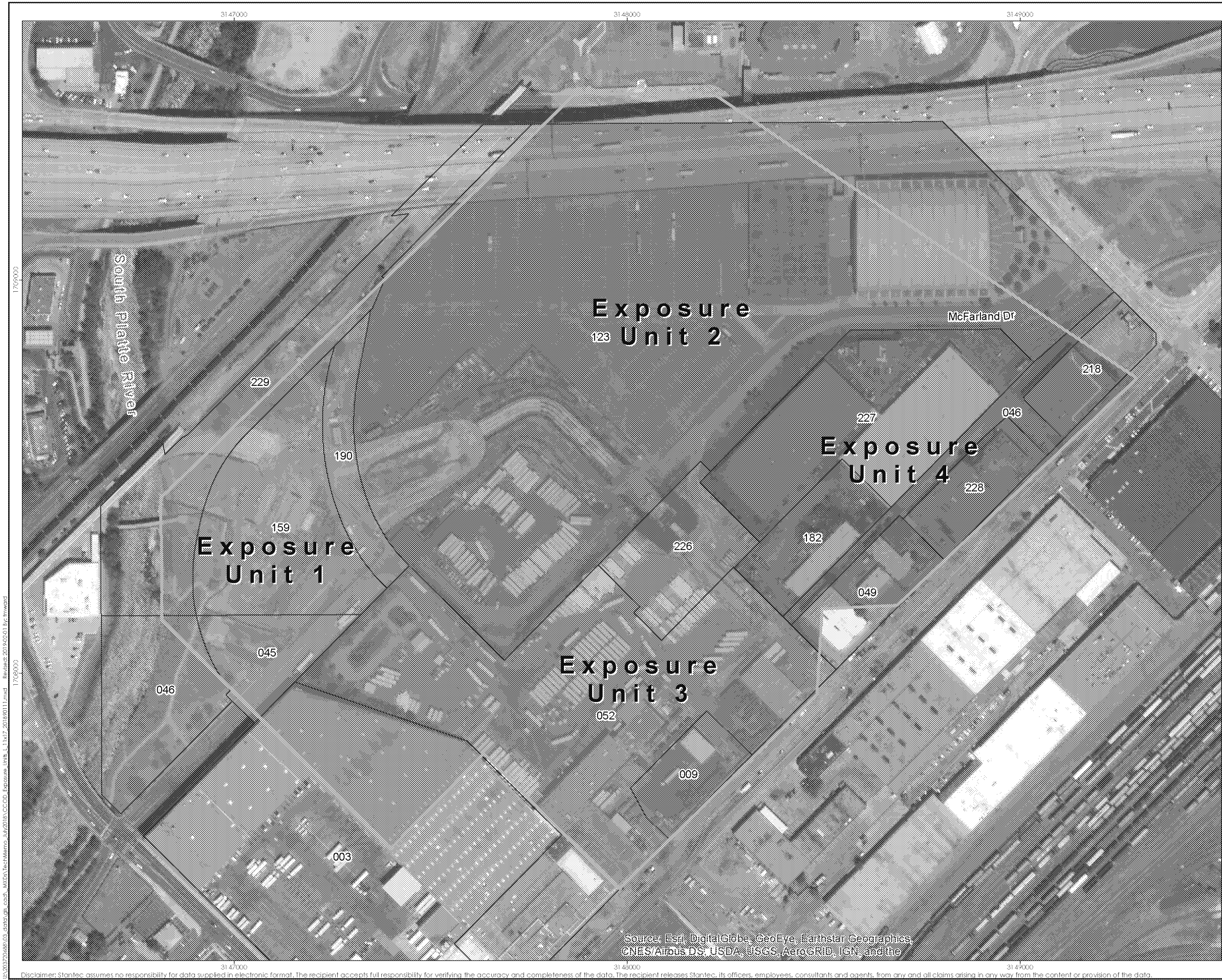
Project Location T3N, R68W, S23 Denver County, CO	Review Prepared by CBB on 2018-07-06 Technical Review by TL on 2018-07-13
----------------------------------------------------------------	----------------------------------------------------------------------------------------







Client/Project
City and County of Denver
VB/I-70 OU2 Remedial Investigation

Figure No.
12

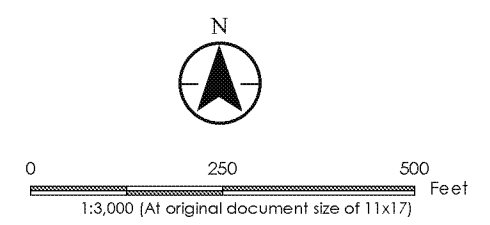
Title
Surface Water and Sediment Sample Locations

Figure 12



-  Operable Unit 2 (OU2)
-  Parcel Boundary
-  Exposure Unit 1
-  Exposure Unit 2
-  Exposure Unit 3
-  Exposure Unit 4

"123" - Parcel Number



- Notes**
- 1. Coordinate System: NAD 1983 HARN State Plane Colorado Central
 - 2. Base Image: ESRI World Imagery Service - DigitalGlobe (6/19/2017)
 - 3. Exposure Units are defined by existing physical boundaries (i.e., streets, rail lines, the South Platte River) that correspond with the known or likely current and future land use.

Project Location	Review
T3N, R68W, S23 Denver County, CO	Prepared by CBB on 2019-01-11 Technical Review by NC on 2019-01-11
Client/Project	
City and County of Denver VB/I-70 Remedial Investigation	
Figure No.	
13	
Title	

OU2 Exposure Units

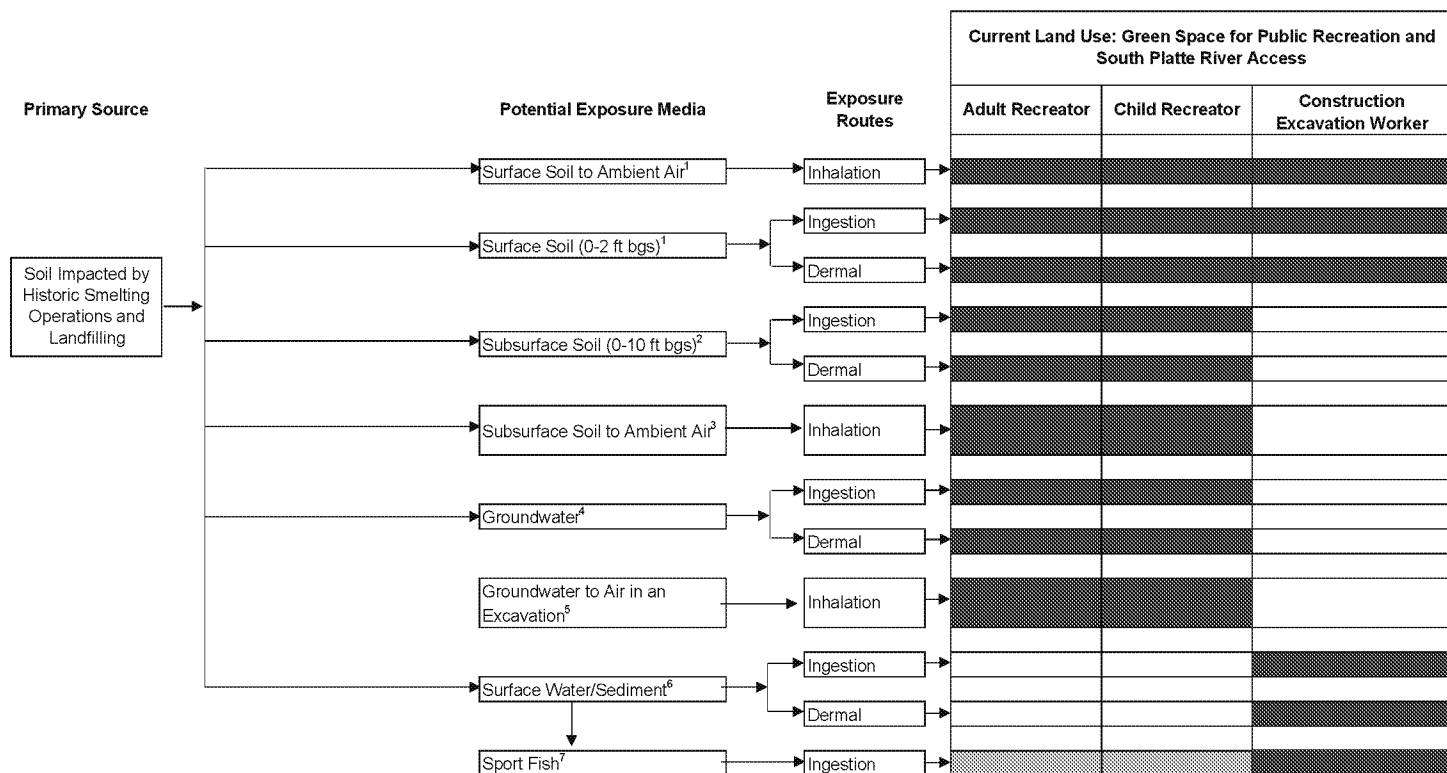
Figure 13

U:\2017\2068\A\3_data\figs\fig_003_Alt1\TechMemo_Jul2018\CCOD_Exposure_Units_L11x17_20180111.mxd Revised: 2019-02-01 By: Inward

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the

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Figure 14. CSM for Exposure Unit 1 - Globeville Landing Park



LEGEND



Exposure pathway is complete or potentially complete. Pathway evaluated quantitatively.



Exposure pathway is potentially complete but contributes little to risk.



Exposure pathway is incomplete.

Globeville Landing Park provides enhanced green space for public recreation and access to the South Platte River.

1 - Surface soil was delisted by USEPA and is not a pathway of exposure to COPCs.

2 - Potential exposures to COPCs in subsurface soil (0 to 10 ft. bgs) applies only to construction or excavation workers.

3 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air by mechanical disturbance of subsurface soil during excavation or construction

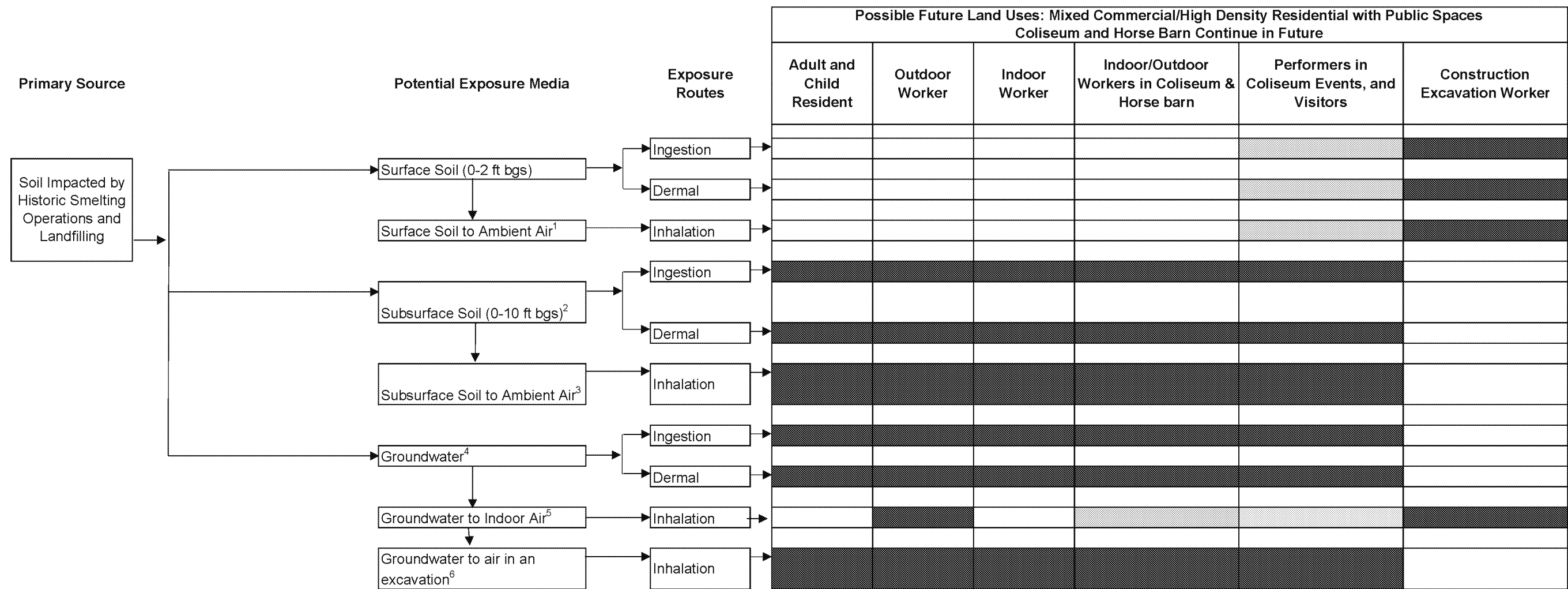
4 - Groundwater is not used as a source of drinking water, but may discharge to the South Platte River.

5 - If present in a location where intrusive activity is occurring, volatile COPCs may accumulate in air inside an excavation.

6 - Recreational visitors to Globeville Landing Park may have direct contact with surface water and sediments in the South Platte River while wading, swimming, canoeing/kayaking, and fishing.

7 - People are known to fish in the South Platte River. Ingestion of fish taken at Globeville Landing Park is a potentially complete, but likely insignificant pathway of exposure to COPCs.

Figure 15. CSM for Exposure Unit 2 - Denver Coliseum and Parking Lot



LEGEND

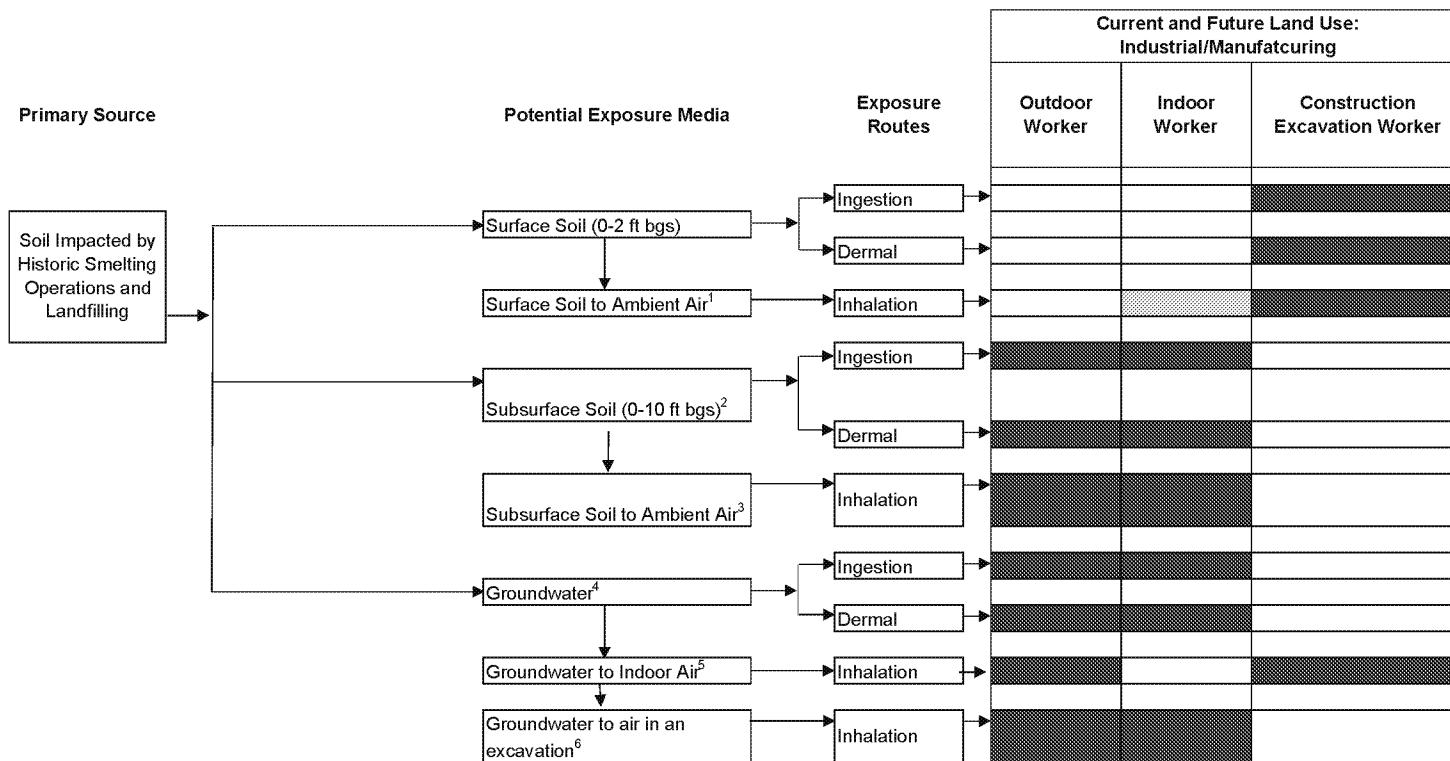
Exposure pathway is complete or potentially complete.
Pathway evaluated quantitatively.

Exposure pathway is potentially complete but contributes little to risk.

Exposure pathway is incomplete.

- 1 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air by wind and mechanical disturbance of surface soil (0 to 2 ft. bgs)
- 2 - Potential exposures to COPCs in subsurface soil (0 to 10 ft. bgs) applies only to construction or excavation workers.
- 3 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air from subsurface soil by mechanical disturbance during construction or excavation.
- 4 - Groundwater is not used as a drinking water source. Construction or excavation worker may have incidental contact with COPCs in groundwater in an excavation.
- 5 - If present beneath a building, VOCs in groundwater may migrate into indoor air (vapor intrusion).
- 6 - If present in a location where intrusive activity is occurring, volatile COPCs may accumulate in air inside an excavation.

Figure 16. CSM for Exposure Unit 3 - Pepsi Bottling Group Property



LEGEND

Exposure pathway is complete or potentially complete.
Pathway evaluated quantitatively.

Exposure pathway is complete or potentially complete. Pathway evaluated quantitatively.

Exposure pathway is incomplete.

1 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air by wind and mechanical disturbance of surface soil (0 to 2 ft. bgs)

2 - Potential exposures to COPCs in subsurface soil (0 to 10 ft. bgs) applies only to construction or excavation workers.

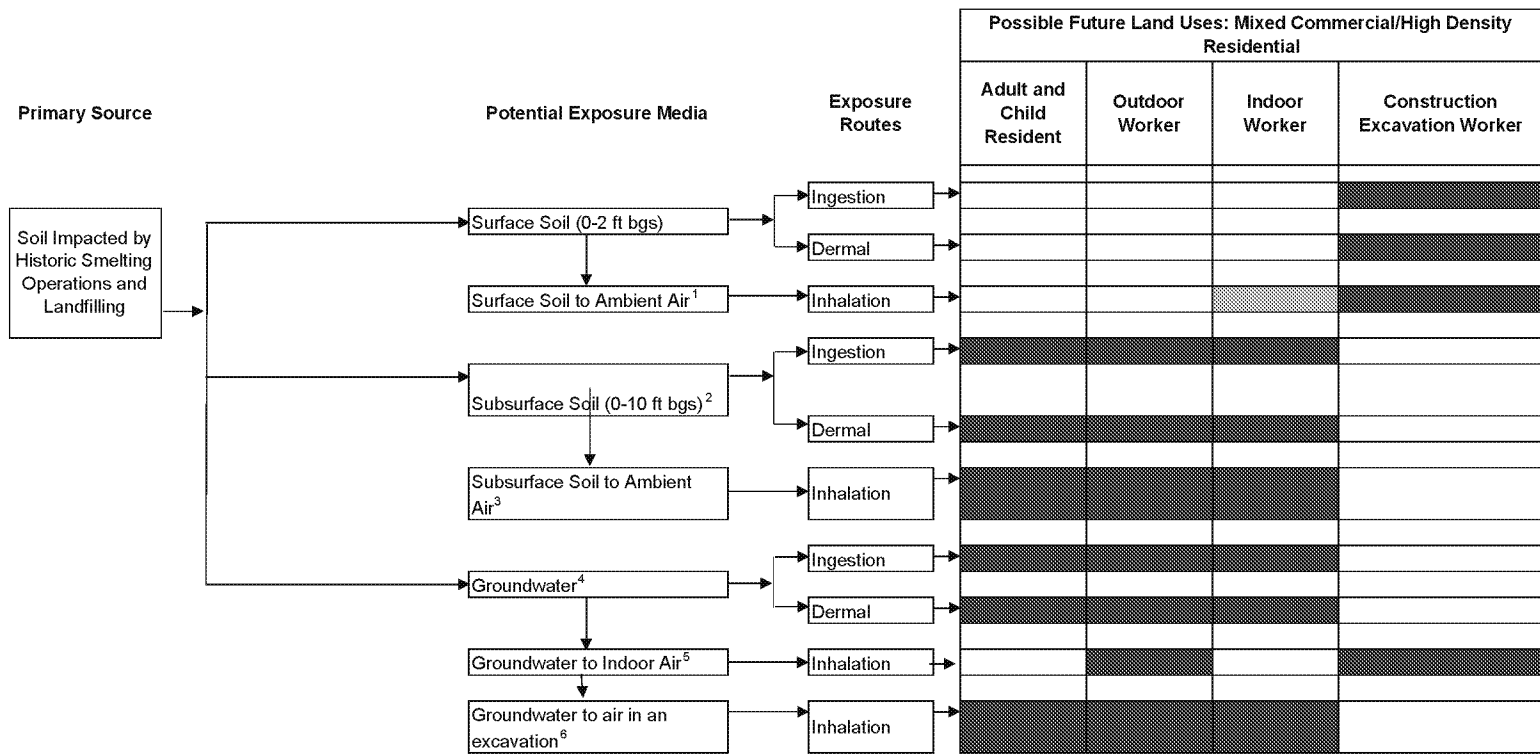
3 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air from subsurface soil by mechanical disturbance during construction or excavation.

4 - Groundwater is not used as a drinking water source. Construction or excavation worker may have incidental contact with COPCs in groundwater in an excavation.

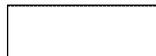
5 - If present beneath a building, VOCs in groundwater may migrate into indoor air (vapor intrusion).

6 - If present in a location where intrusive activity is occurring, volatile COPCs may accumulate in air inside an excavation.

Figure 17. CSM for Exposure Unit 4 - Brighton Boulevard Area



LEGEND



Exposure pathway is complete or potentially complete. Pathway evaluated quantitatively.



Exposure pathway is complete or potentially complete. Pathway evaluated quantitatively.



Exposure pathway is incomplete.

1 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air by wind and mechanical disturbance of surface soil (0 to 2 ft. bgs)

2 - Potential exposures to COPCs in subsurface soil (0 to 10 ft. bgs) applies only to construction or excavation workers.

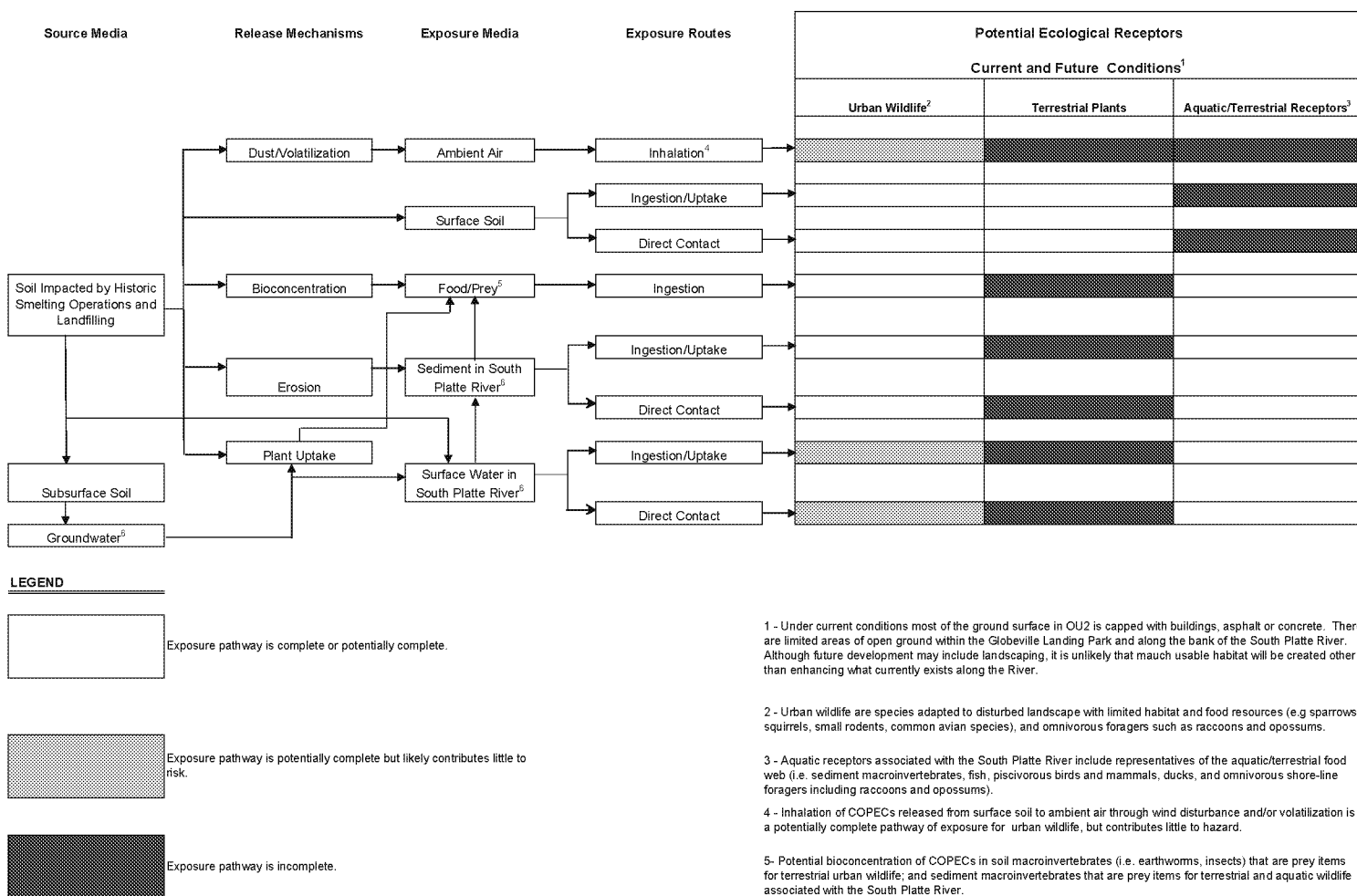
3 - Inhalation of COPCs adsorbed to soil particles or vapors released to ambient air from subsurface soil by mechanical disturbance during construction excavation.

4 - Groundwater is not used as a drinking water source. Construction or excavation worker may have incidental contact with COPCs in an excavation.

5 - If present beneath a building, VOCs in groundwater may migrate into indoor air (vapor intrusion).

6 - If present in a location where intrusive activity is occurring, volatile COPCs may accumulate in air inside an excavation.

Figure 18. Ecological CSM for VB/I-70 OU2



APPENDIX A

2004 and 2005 Soil and Groundwater Phase I Investigations Figure





LEGEND

FORMER OMAHA & GRANT SMELTER
ON-FACILITY SITE BOUNDARY
(OPERABLE UNIT 2)

GROUNDWATER MONITORING
WELL

SOIL BORING

PROPOSED
SEDIMENT / SURFACE WATER
SAMPLING LOCATION

APPROXIMATE LIMIT OF UNPAVED
AREAS FOR SHALLOW SURFACE
SOIL SAMPLING:

3801 BRIGHTON BOULEVARD

4201 BRIGHTON BOULEVARD

4301 BRIGHTON BOULEVARD

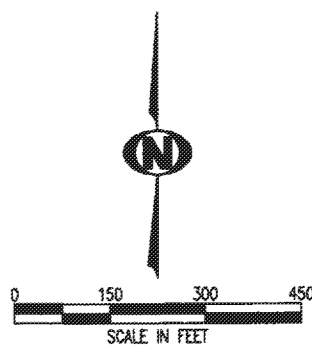
4375 BRIGHTON BOULEVARD

4600 HUMBOLT STREET

01

SECTOR ID
SECTOR CORNER FOR SUBSAMPLE
DISTANCE MEASUREMENT
(PROJECTED AS NEEDED)

CONCRETE/PAVEMENT/
STRUCTURE LOCATION (AREA
COULD NOT BE SAMPLED)



VB/I-70 OU2
Denver, Colorado

PHASE I INVESTIGATION
LOCATIONS

NOTE: MONITOR WELL AND SOIL BORING
LOCATIONS ARE APPROXIMATE (i.e. HAVE
NOT BEEN SURVEYED)

AERIAL PHOTO DATE: APRIL 2000

EnviroGroup Limited
Centennial, Colorado

FIGURE 1 SEPT 2005

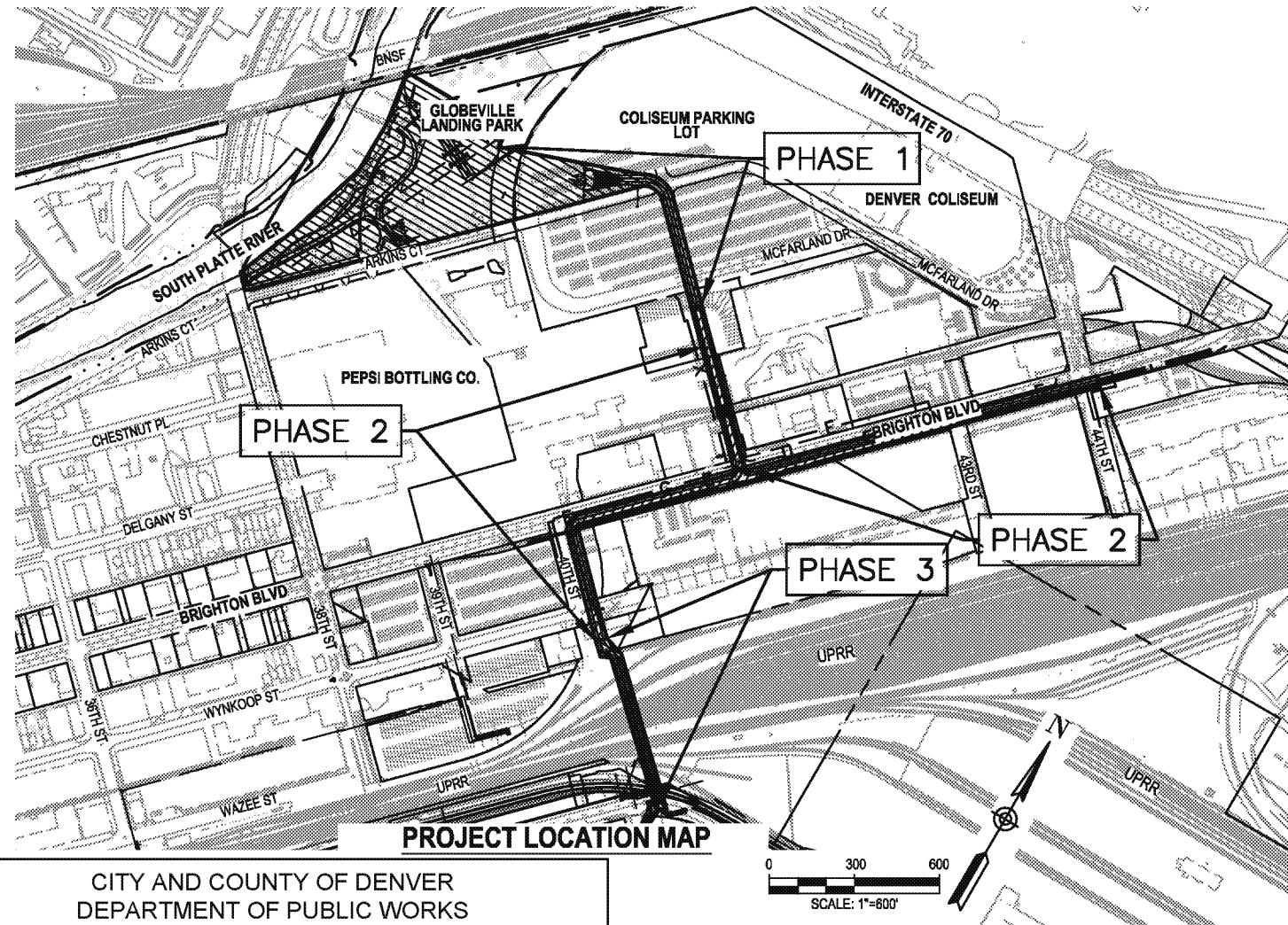
AS-0423

APPENDIX B

OU2 GLO Project Excavation Drawings



FINAL CONSTRUCTION
PLAN SUBMITTAL
FOR REVIEW ONLY



Sheet List Table	
Sheet Number	Sheet Title
1	COVER SHEET
2	GENERAL NOTES
3	GENERAL NOTES
4	GENERAL NOTES
5	GENERAL NOTES
6	DRAWING LEGEND
7	DENVER STANDARD DRAWING LIST
8	PLAN & PROFILE, MCFARLAND DR. TO BRIGHTON BLVD
9	PLAN AND PROFILE, BRIGHTON BLVD TO 40TH ST
10	PLAN AND PROFILE, 40TH ST TO UPRR
11	PLAN AND PROFILE, 41ST ST TO 43RD ST
12	PLAN AND PROFILE, 43RD ST TO 44TH ST
13	PLAN AND PROFILE, 44TH ST TO I-70
14	ENLARGED PLAN - PEPSI BOTTLING CO. & CWJ AXLES
15	ENLARGED PLAN - 40TH STREET
16	TYPICAL SECTION, PEPSI BOTTLING CO.-15' x 12' RCB
17	TYPICAL SECTION, BRIGHTON BLVD-14' x 12' RCB
18	TYPICAL SECTION, BRIGHTON BLVD.-8' x 8' RCB
19	SUBGRADE STABILIZATION DETAILS
20	TRENCHING AND PAVING DETAILS
21	STORM SEWER DETAILS
22	PRECAST RCB JOINT DETAIL
23	GAS VENTING DETAILS
24	SANITARY SEWER AND STORM SEWER RELOCATION PLAN AND PROFILE
25	TRANSITION STRUCTURE NO. 2
26	SURVEY CONTROL DIAGRAM
27	HORIZONTAL CONTROL PLAN
28	HORIZONTAL CONTROL PLAN
29	OVERALL OWNERSHIP MAP
30	OVERALL OWNERSHIP MAP
31	FORESTRY DETAILS
S1	GENERAL STRUCTURAL NOTES AND ABBREVIATIONS
S2	OVERALL STRUCTURAL LAYOUT PLAN
S3	15' x 12' CIP BOX CULVERT-TYPICAL SECTION
S4	15' x 12' CIP BOX CULVERT-SECTION AT RR SPUR
S5	15' x 12' CIP BOX CULVERT-SECTION ADJACENT TO RR SPUR
S6	TRANSITION STRUCTURE NO. 2-BASE SLAB PLAN
S7	TRANSITION STRUCTURE NO. 2-TOP SLAB PLAN
S8	TRANSITION STRUCTURE NO. 2-LONGITUDINAL SECTION
S9	TRANSITION STRUCTURE NO. 2-DOWNSTREAM SECTION
S10	TRANSITION STRUCTURE NO. 2-UPSTREAM SECTION
S11	TRANSITION STRUCTURE NO. 2-UPSTREAM ELEVATION
S12	TRANSITION STRUCTURE NO. 2-MISC. DETAILS
S13	8' x 8' CIP BOX CULVERT BEND-PLAN
S14	8' x 8' CIP BOX CULVERT BEND-SECTION
S15	14' x 12' CIP BOX CULVERT BENDS-PLAN
S16	14' x 12' CIP BOX CULVERT BENDS-SECTION
S17	14' x 12' CIP BOX CULVERT-TYPICAL SECTION
S18	MISCELLANEOUS SECTIONS AND DETAILS


CITY AND COUNTY OF DENVER DEPARTMENT OF PUBLIC WORKS	
APPROVED:	
_____ EXECUTIVE DIRECTOR OF PUBLIC WORKS	_____ SIGNATURE DATE
_____ CITY ENGINEER	_____ SIGNATURE DATE
_____ DIRECTOR OF ENGINEERING CAPITAL PROJECTS	_____ SIGNATURE DATE
_____ CITY TRAFFIC ENGINEER	_____ SIGNATURE DATE



APPROVED: URBAN DRAINAGE & FLOOD CONTROL DISTRICT

EXECUTIVE DIRECTOR

MANAGER OF DESIGN, CONSTRUCTION AND MAINTENANCE PROGRAM

SENIOR PROJECT ENGINEER OF DESIGN, CONSTRUCTION AND MAINTENANCE PROGRAM

The seal of the Urban Drainage and Flood Control District is a circular emblem. It features a stylized landscape with mountains in the background, a winding river or path in the foreground, and a city skyline with several buildings in the middle ground. The words "URBAN DRAINAGE AND FLOOD CONTROL DISTRICT" are inscribed around the perimeter of the circle.

<p>GLOBEVILLE LANDING OUTFALL PROJECT - PHASE 2</p> <p>MASTER PROJECT NO: 2015-PROJMSTR-0000638</p> <p>COVER SHEET</p>	<p>DENVER THE MILE HIGH CITY</p>  <p>DEPARTMENT OF PUBLIC WORKS</p> <p>201 WEST COLFAX AVENUE DENVER, CO 80202 PHONE: (720) 913-4501 FAX: (720) 913-4544</p>	<p>MERRICK® & COMPANY</p>  <p>Merrick & Company 2420 Alcott Street Denver, CO 80211 (303) 964-3333</p>	NO.	DESCRIPTION OF REVISIONS	DATE	BY
<p>DRAWN BY:</p> <p>DESIGNED BY:</p> <p>APPROVED BY:</p> <p>DRAWING NAME: 8594-CS-PHASE II</p> <p>DATE: APRIL 20, 2016</p> <p>SHEET NO.: 1 OF 31</p>						

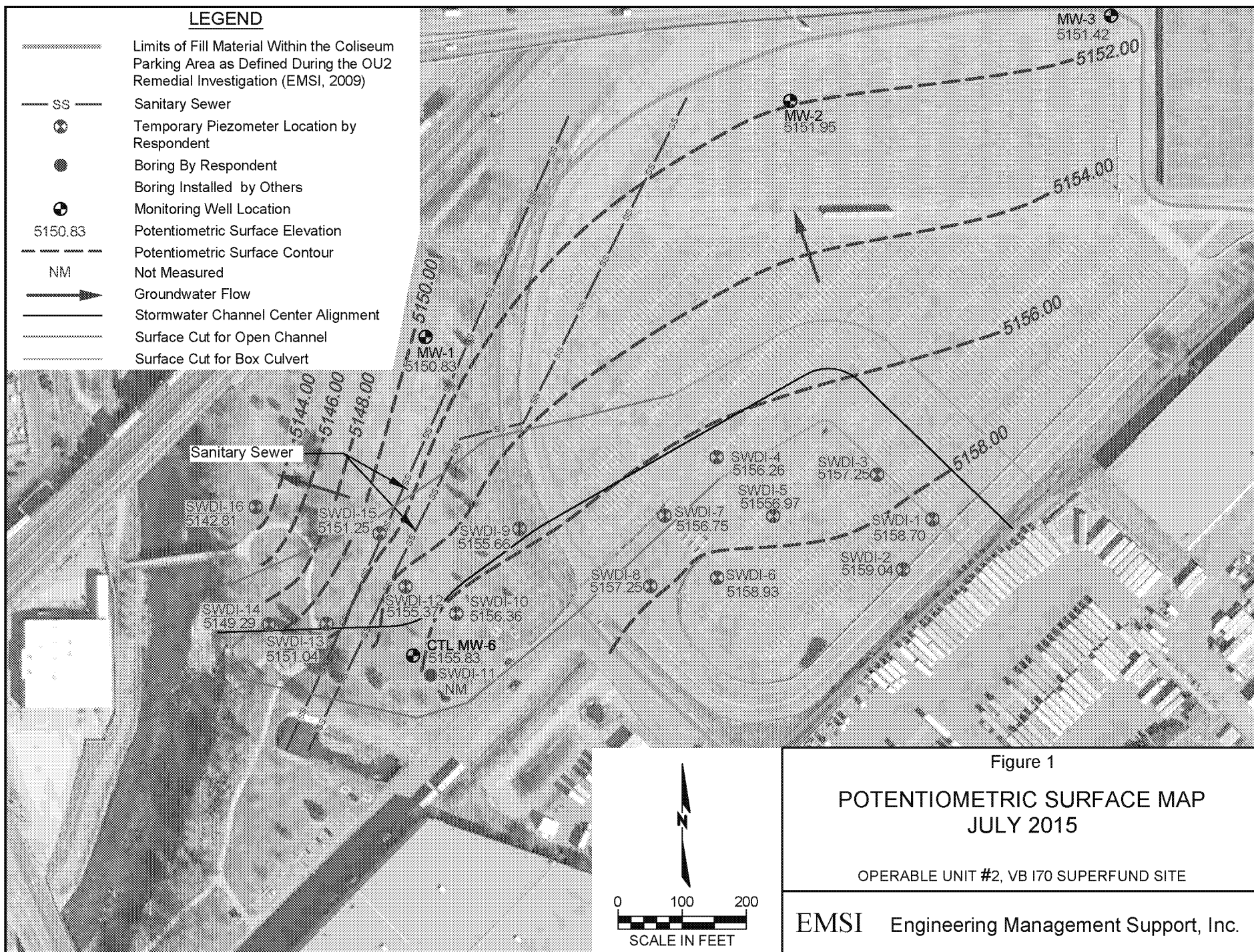


APPENDIX C

Previous Potentiometric Surface Depiction and Figures from the 2009 Human Health Risk Assessment



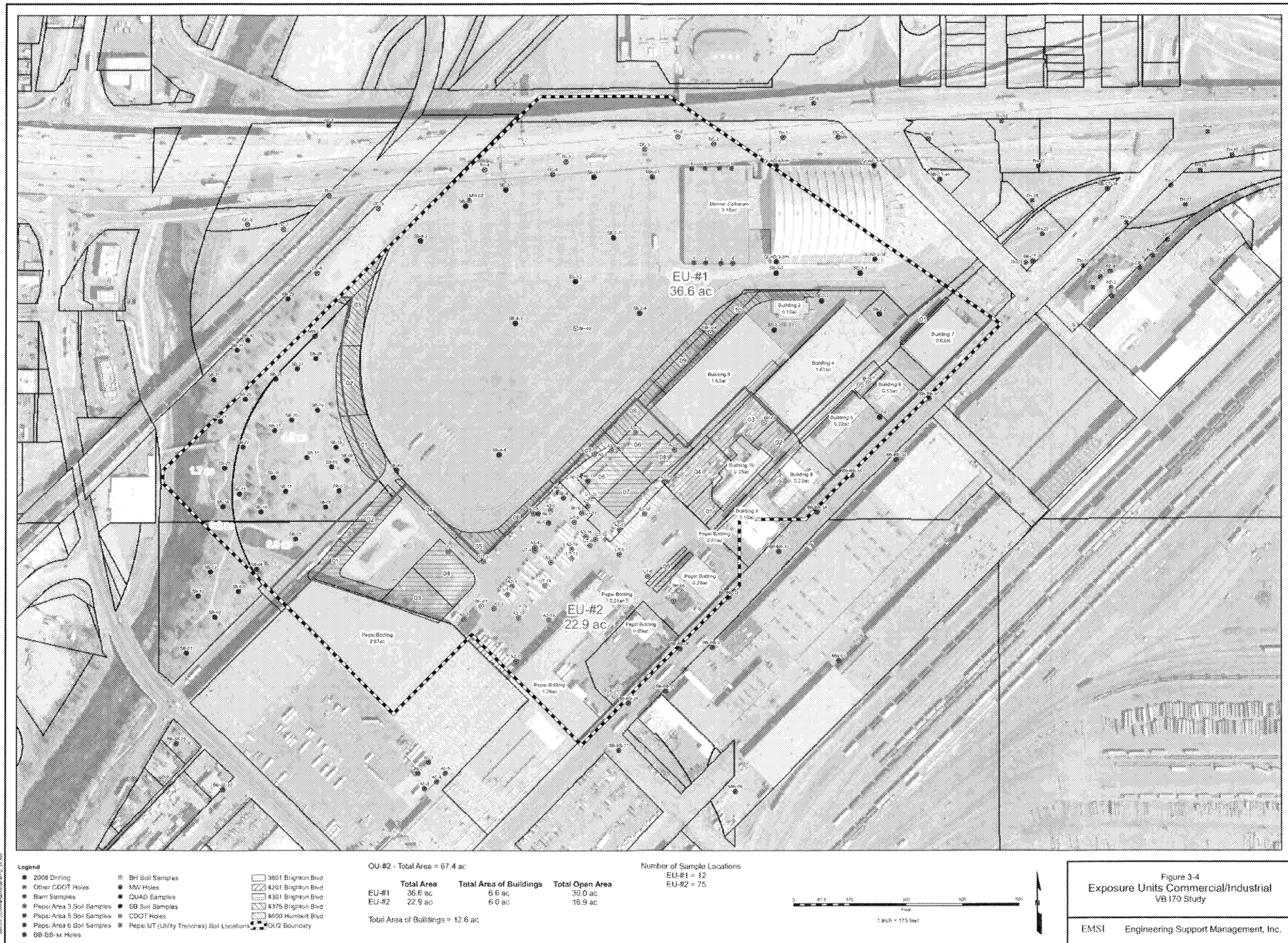
FIGURE FROM EMSI, 2016



APPENDIX D

2009 HHRA Figures 3-4 and 3-5





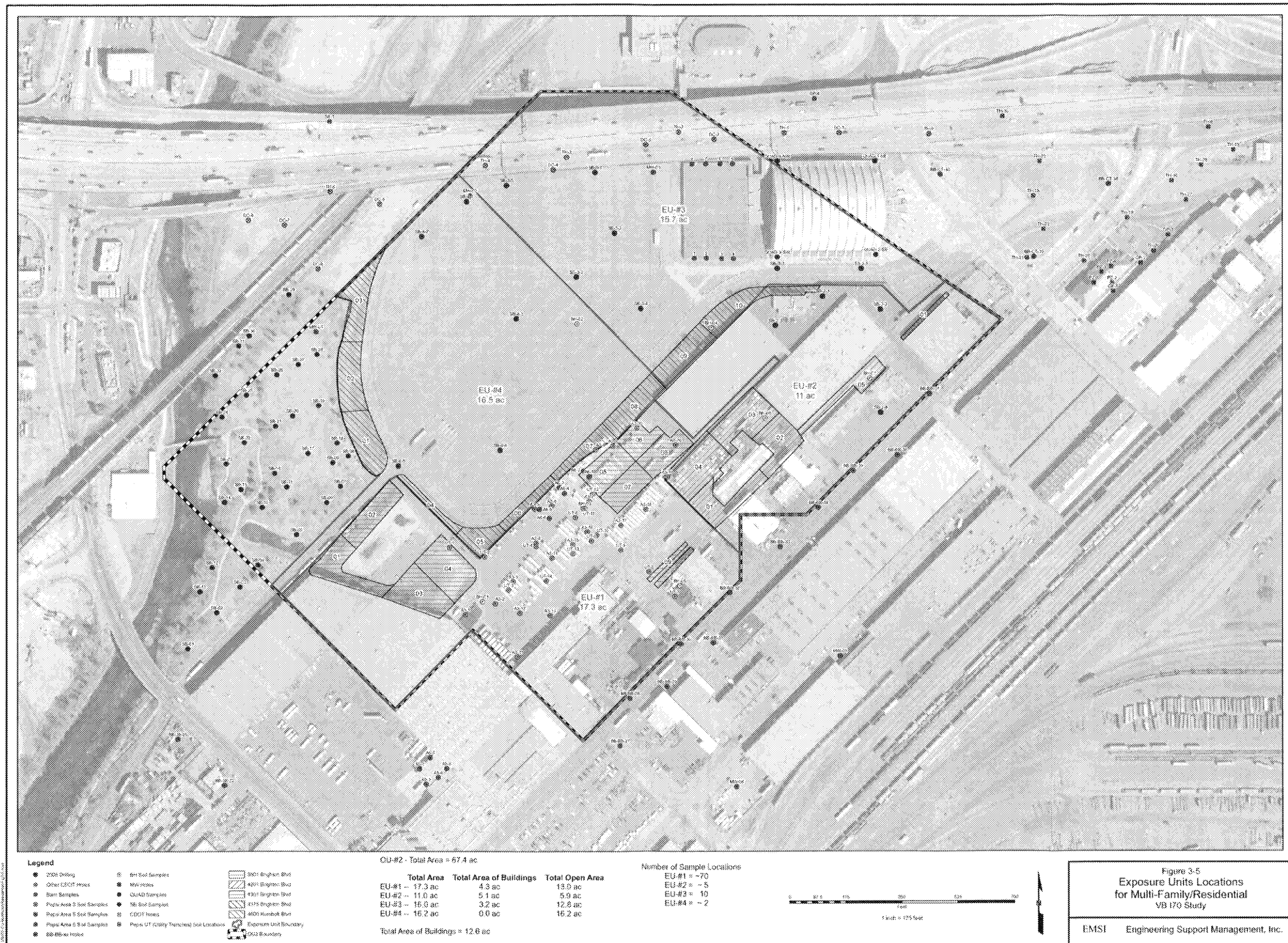


Figure 3-5
Exposure Units Locations
for Multi-Family/Residential
VB 170 Study

EMSI Engineering Support Management, Inc.